- Detailed description of Gulf States' Demopolis continuous pulp mill
- Costs and available materials for pipe and fittings
- Chemical utilization of lignins

The Paper Industry

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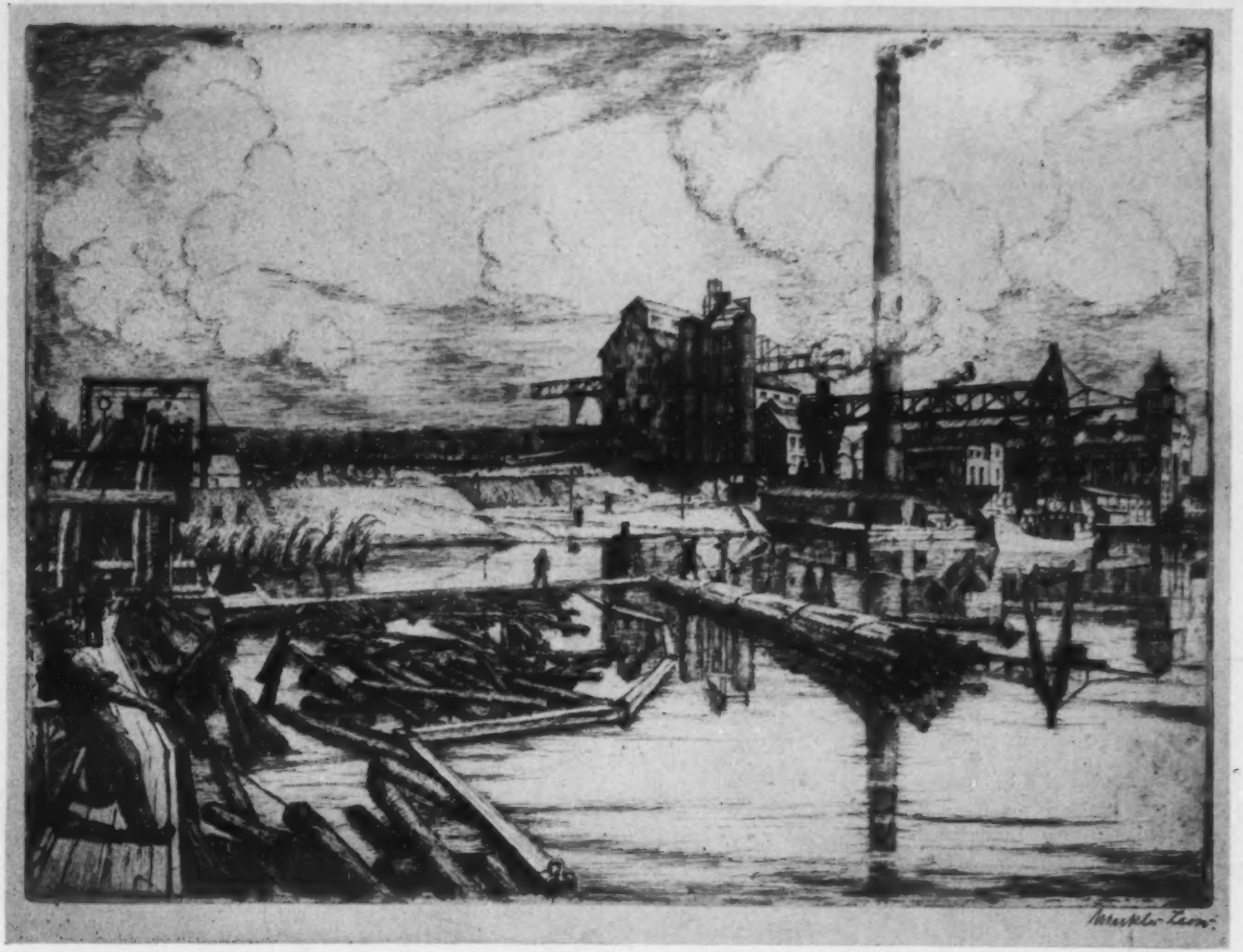

"Log Harbor" **Original etching by Paul Winkler-Leers from the Asten-Hill collection.**

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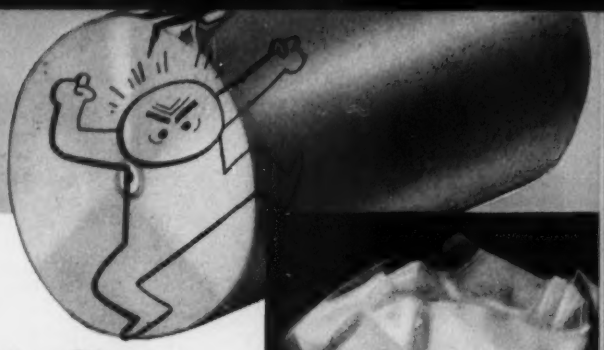
PENT-UP ENERGY destroys paper...

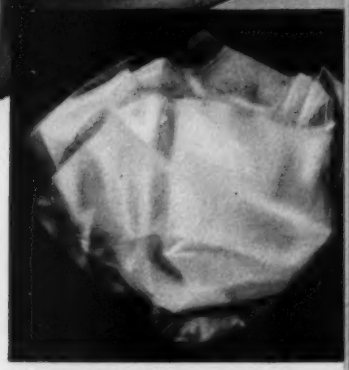
It can crack a roll like a dried log. It is also a major reason for costly snap-offs when feeding to printing presses or converting processes.



CAMERON

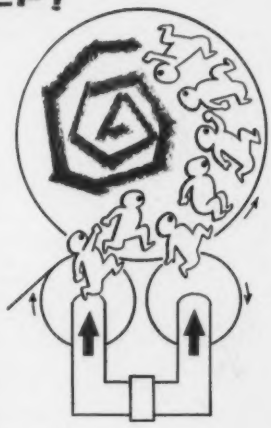
Automatic Roll Density Controller*

PUTS PAPER TO SLEEP!



Crumple a piece of paper and toss it on your desk. The small measure of energy applied by your hand is stored in the paper. Watch the paper move, stretching and twisting, as the pent-up energy seeks release. **In a similar way,** the winding operation stores active energy in paper rolls. This pent-up energy, seeking release, is a major cause of damage to paper in shipping and storage.

HERE'S HOW IT WORKS:



(see diagram at right)
At the start of the run the rewind drums and riding roll are driving the rewind roll to assure tight starts and firmly set cores.

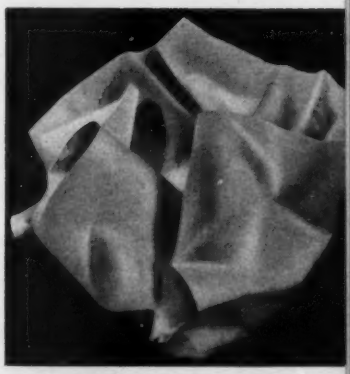
(see diagram below)
At a predetermined diameter the Automatic Roll Density Controller is engaged. As the rewind roll increases in diameter the Density Controller absorbs an increasing amount of energy from the rewinding roll...removing energy that would normally be "locked in" the rewound roll. Most of the energy removed from the rewinding roll is regenerated and fed back to the main drive.

The fully Automatic Roll Density Controller provides optimum roll quality . . . rolls that will not burst, but firm enough to be shipped and handled without "flatting" or other damage.

In contrast to the principle of absorbing energy by speed differential between rewind drums, the Automatic Roll Density Controller absorbs energy externally, avoiding scuffing and scratching of the sheet... there is no slip of the roll relative to the rewind drums.

The Cameron Automatic Roll Density Controller is another example of the time-and-money-saving inward excellence of Cameron winders. Cameron specialists welcome any opportunity to show the way to dependable, low cost, high speed production of better rolls of any material.

* PATENT APPLIED FOR



In a few seconds, the energy stored in the crumpled paper has been released. The paper will now remain "asleep" indefinitely. **The energy** stored in paper rolls by the winding operation is removed by the **CAMERON Automatic Roll Density Controller.** The Density Controller puts the paper to sleep, eliminates snap-offs caused by rolls wound too hard, permits winding larger diameter rolls to feed presses through longer running time, reduces damage in shipping and storage.

Cameron Machine Company, Franklin Road, Dover, N. J.

Canada: Cameron Machine Co. of Canada, Ltd., Royal Bank Bldg., Toronto 1

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BUILT BY CAMERON's team of specialists

80 years devoted exclusively to the design and manufacture of slitting and roll winding equipment.

SF announces:

PAPER PULP NOW AIRBORNE IN NEW FLAKT DRYER

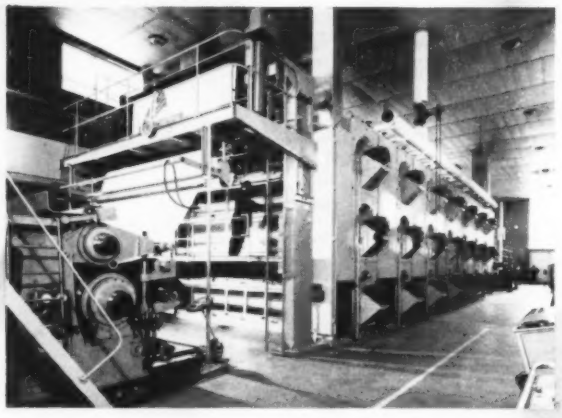
SF Flakt Dryer, Type L, introduces a uniquely advanced concept of paper pulp drying: working with hot air at atmospheric pressure, the type L Flakt Dryer features an *air borne* pulp sheet floating through the dryer without the help of any mechanical conveyor.

NEW: **INCREASED OUTPUT.** The type L Flakt Dryer can be built for larger capacities and higher speeds than earlier models.

NEW: **SMALLER OVER-ALL DIMENSIONS** save valuable floor space. The new air circulation system gives a considerably increased drying effect, thereby reducing the length of the unit.

NEW: **LESS MAINTENANCE.** The absence of a mechanical conveyor system saves man-hours spent on lubrication and maintenance. Expensive production gaps because of conveyor changes are eliminated.

NEW: **AUTOMATIC THREADING,** Flakt Dryer, Type L, can be provided with automatic threading.



SF Flakt Dryer, type L, with 11 decks, designed for drying 110 short tons of pulp per day from 45% BD to 90 BD. Main dimensions: length 55', width 20', height 18'. In operation at Oskarström Sulphite Mills AB, Sweden, since the beginning of 1956.

For further information, please write

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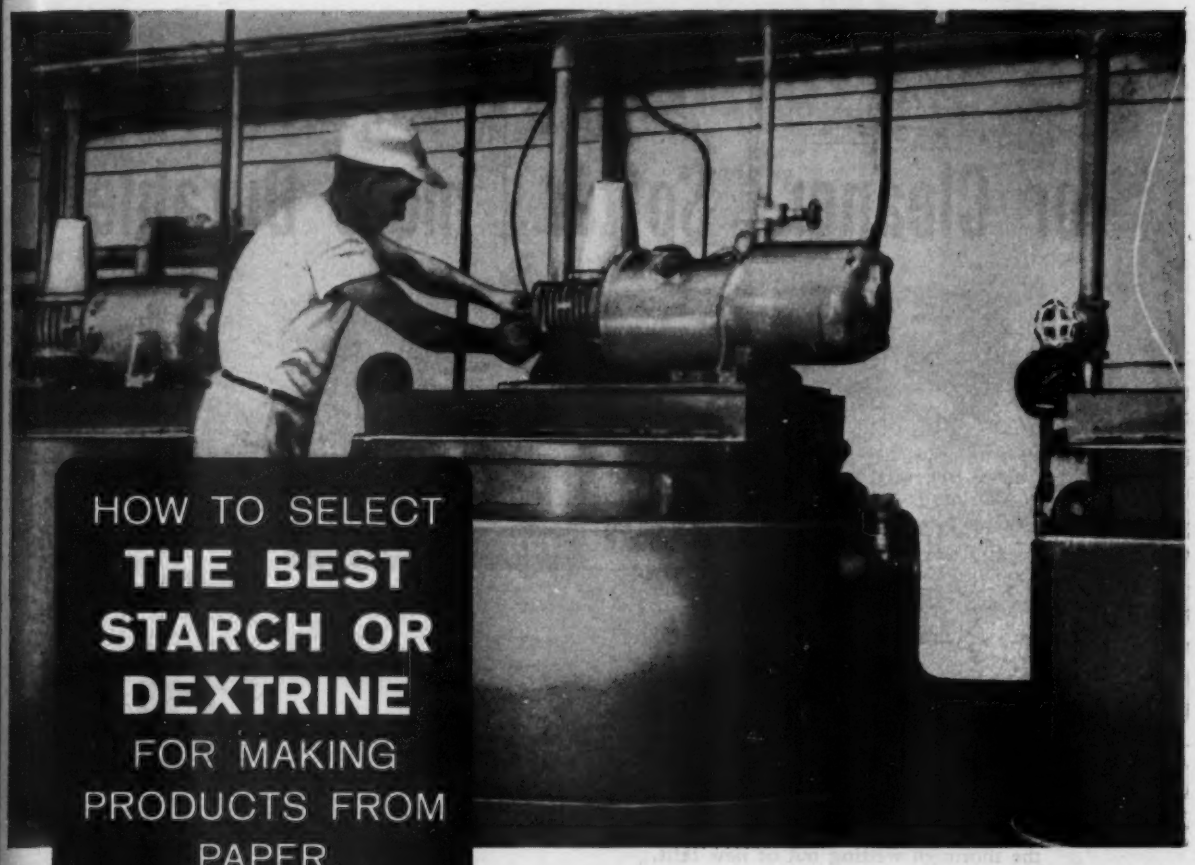

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for Cleaner | Softer | more Durable

FELTS

USE **d-i LESTOIL** LIQUID DETERGENT

d-i LESTOIL will restore the most heavily soiled felts to the porous, soft condition necessary for the continuous manufacture of paper. d-i LESTOIL is highly effective for washing felts used in the production of all grades of paper. Its cleansing action is thorough either on or off the machine. d-i LESTOIL is useful in the thorough wetting out of new felts.

You profit 5 ways with d-i LESTOIL

1. Improves the cleansing efficiency of felt washing.
2. Starts laundering action immediately because wetting is instantaneous.
3. Penetrates deep into the innermost fibres.
4. Removes ALL soil or residue because cleansing action is complete.
5. Rinses thoroughly — felts are like new, free of all soil.

Complete cleansing with d-i LESTOIL makes felts last longer between washings, thus giving better performance and added life. You'll like the continued softness and openness maintained by laundering felts with this effective detergent. You'll like the savings that show up because felt replacement costs stay down — longer runs between washings and production quality are maintained.

NOTE: The same dependable action of d-i LESTOIL can be counted on for producing cleaner, brighter, finer papers when used in pulping and washing processes for removal of ink, grease, wax, asphalt, and adhesives. Clean fibres also help maintain clean felts.

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The Paper Industry

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POWELL

world's largest family of valves

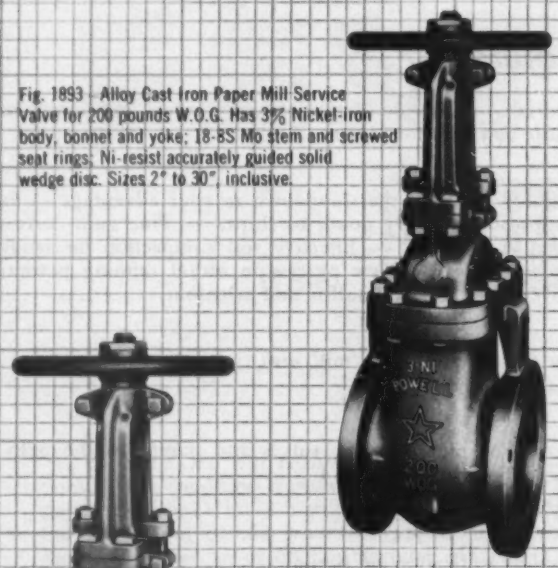
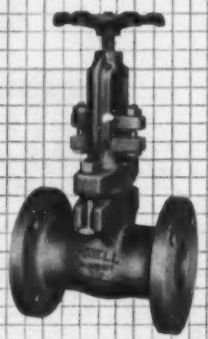


Fig. 1893 - Alloy Cast Iron Paper Mill Service Valve for 200 pounds W.O.G. Has 3½ Nickel-iron body, bonnet and yoke; 18-8S Mo stem and screwed seat rings; Ni-resist accurately guided solid wedge disc. Sizes 2" to 30", inclusive.



Figs. 2195 - 2196 - Flanged end Ni-resist O.S. & Y. Gate Valve for 200 pounds W.O.G. Sizes 1" to 3", inclusive. Fig. 2195 has regular face to face; Fig. 2196 has short face to face.

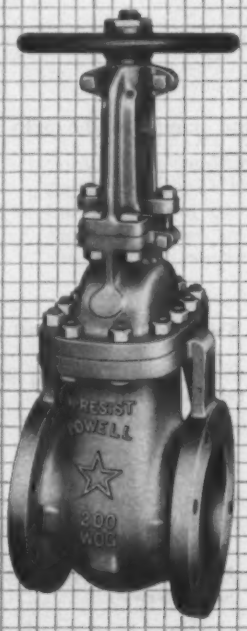


Fig. 2193 - Ni-resist O.S. & Y. Gate Valve for 200 pounds W.O.G. Bolted flanged bonnet, flanged ends. Two-piece yoke, 5" to 12". Valve with one-piece yoke also available in 4" size.

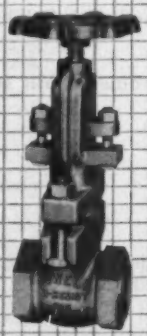


Fig. 2194 - Small Screwed end Ni-resist Gate Valve for 225 pounds W.O.G. Bolted bonnet, outside screw rising stem and yoke. Size 4".

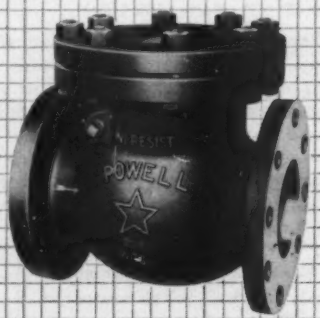


Fig. 2192 - Flanged End Ni-Resist Swing Check Valve for 200 pounds W.O.G. Bolted flanged cap. Sizes 2" to 12", inclusive.

Powell offers more kinds or types of valves, available in the largest variety of metals and alloys, to handle every flow control requirement. Included in the Line are those shown—valves especially made for Pulp and Paper Mill Service. Consult your local Powell Valve distributor—if none is near you, write

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From our point of view..

The role of pipe, fittings, valves and pumps in the pulp and paper industry

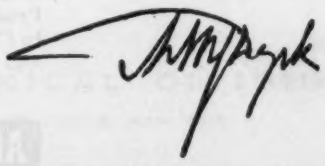
In this issue we are introducing a series of articles on the use of pipe, fittings, valves and pumps in the pulp and paper industry. The series is being written by Roland Allen Jr., formerly of J. E. Sirrine Co. and now vice president of Eastern Engineering Co. Mr. Allen, who has a Masters Degree in engineering, is exceedingly well qualified to develop this series on a scope never to our knowledge attempted before. Mr. Allen's extensive experience at J. E. Sirrine Co., where as an engineer he was responsible for the pipe, valve and pump installations in many new mills, will give this series an authoritative treatment that is not easily matched. The reader will also appreciate Mr. Allen's writing style, which is factual, clear and direct.

Since, as pointed out by Mr. Allen, 10-15 per cent of the cost of a complete pulp and paper mill must be attributed to pipe, fittings and valves, it is not difficult to appreciate the importance that should be given to the selection of this equiment.

Pipe, fittings, valves and pumps further fall into the category of equipment that requires considerable maintenance and—in many applications—a more frequent replacement than is the case with some of the more permanent equipment. Replacement of this equipment may also be required in older mills where an upgrading of product quality is desired to meet stiffer competition.

All this adds up to the fact that there will be a good market for this equipment even if new mill expansions are temporarily slowed down. Maintenance expenditures are needed to keep production costs at a minimum, while replacement of excessively worn or corroded equipment is dictated by the market's demand for superior quality products. No matter how firmly the top management of the pulp and paper industry may insist on its no-spending policy in the face of the temporarily slowed-down business activity, there can be no justification for withholding funds where it concerns the purchase of equipment that is essential to operating cost reduction, better productivity and product quality improvement.

The series on pipe, fittings, valves and pumps will be widely read. It will be as complete as possible. It will acquaint pulp and paper mill management, engineers and superintendents with the available types and materials, their expected performance, and their application in the various mill operations. It will also give equipment manufacturers a better insight into the requirements of the pulp and paper industry.



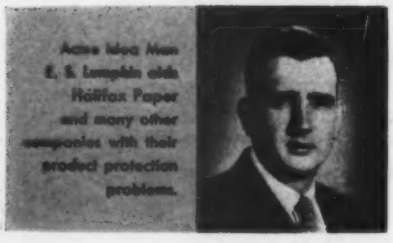
Work with your AIM*. . . Halifax Paper does . . .

Strapped paper rolls arrive in top condition

HALIFAX PAPER COMPANY, ROANOKE RAPIDS, N. C., sought a way to ship carloads of kraft paper without damage occurring to rolls while in transit. So they called in their Acme Idea Man.

Together they worked out a bracing method that not only insures arrival of paper in damage-free condition, but saves money and man-hours. (Idea No. U1-13)

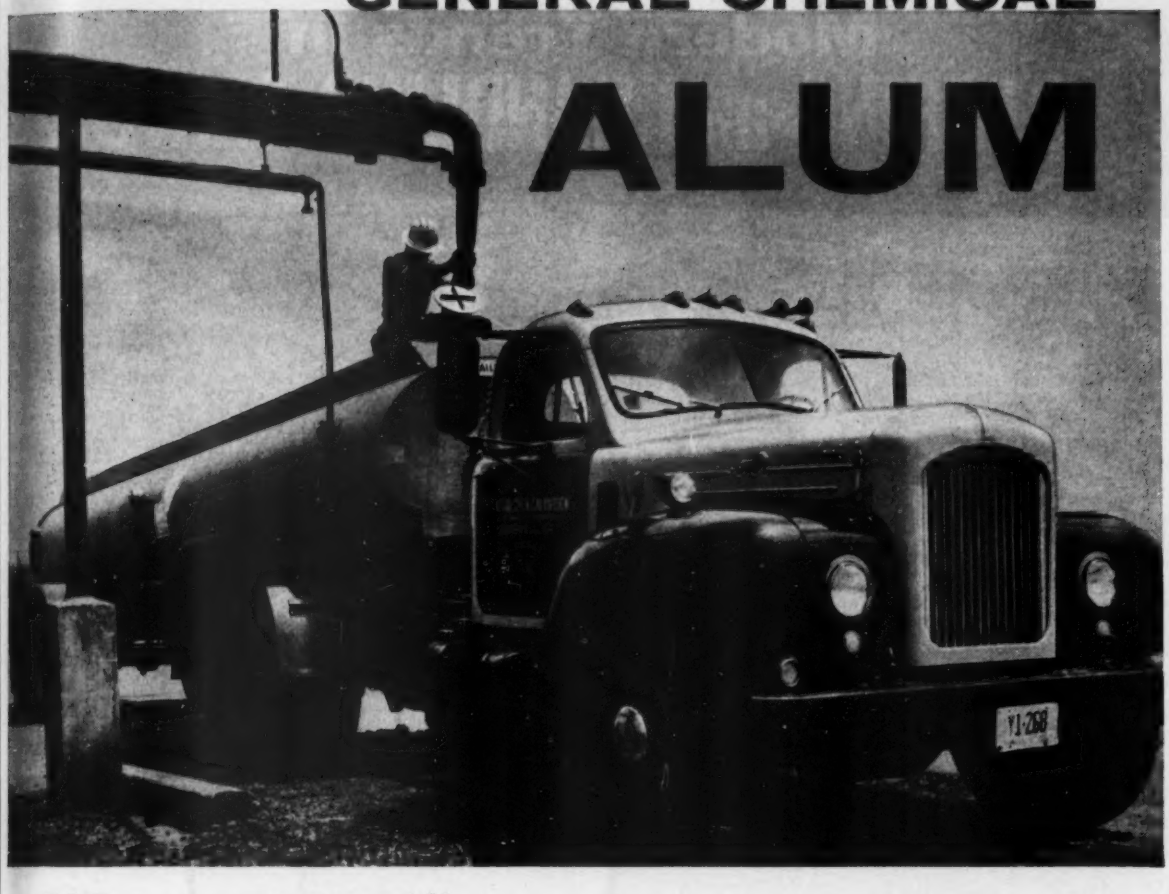
Rolls of paper are positioned over heavy-duty Acme Steel Strapping placed lengthwise on the floor of the box car. Then the strap is brought over the top of the rolls, tensioned and sealed. This binds the rolls in place into units, preventing damage to the paper caused by in-transit vibration and impacts. And, the shorter time it takes to secure the rolls adds up to a considerable saving.



***Work with your Acme Idea Man.** His ideas for protecting products —and saving time and materials while doing so—have proved effective for hundreds of companies. Write Dept. PKU-48, Acme Steel Products Division, Acme Steel Company, Chicago 27, Illinois. In Canada, Acme Steel Company of Canada, Ltd., 743 Warden Ave., Toronto 13, Ontario.

ACME STEEL **STEEL STRAPPING**

GENERAL CHEMICAL



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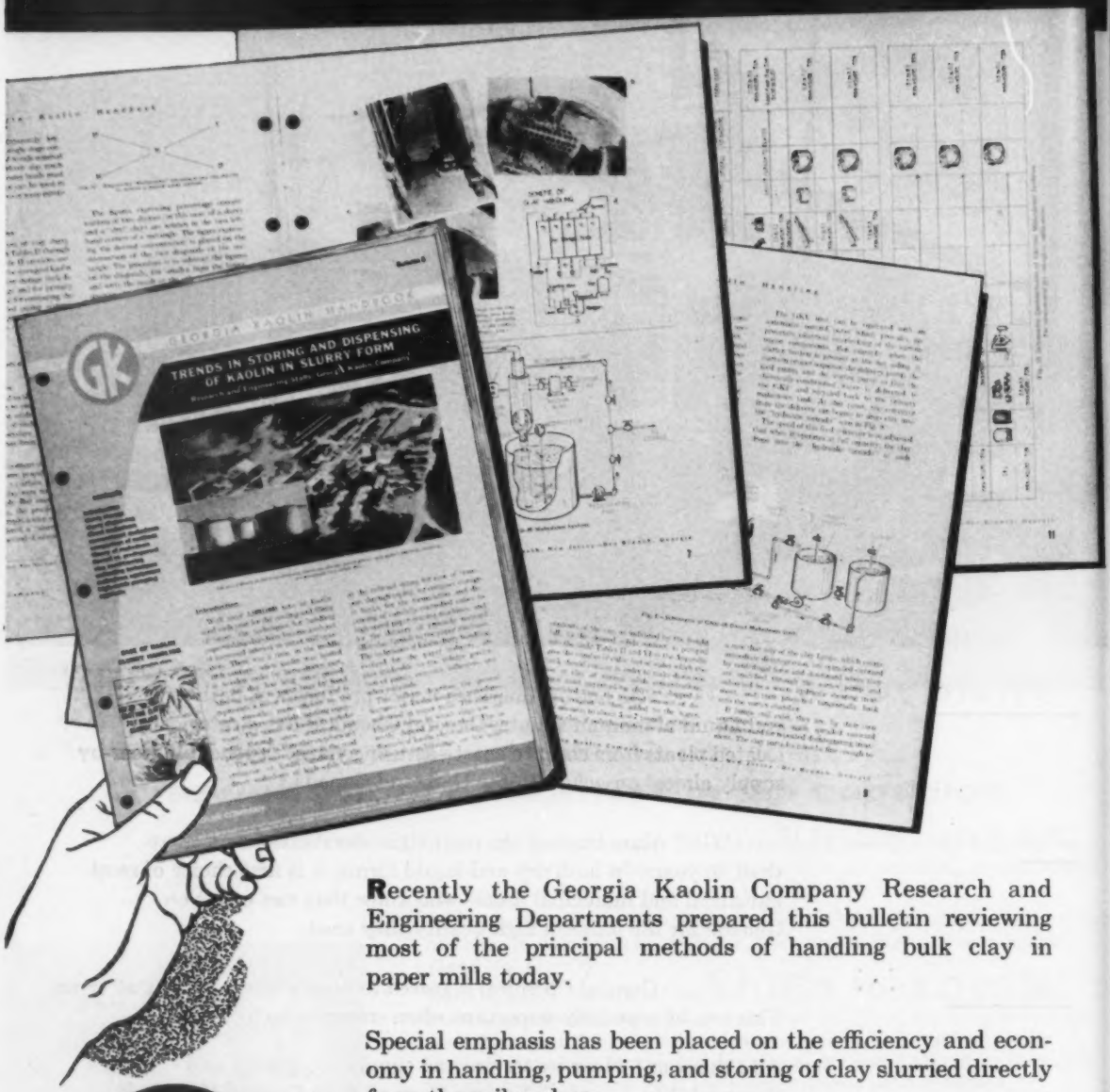
Modern Trends in STORING and HANDLING CLAYS



Recently the Georgia Kaolin Company Research and Engineering Departments prepared this bulletin reviewing most of the principal methods of handling bulk clay in paper mills today.

Special emphasis has been placed on the efficiency and economy in handling, pumping, and storing of clay slurried directly from the railroad car.

Paper mill engineering staffs studying the expansion or modernization of their bulk clay handling plants will find the charts, tables, and data contained in this bulletin very useful in planning their future systems.

GEORGIA KAOLIN COMPANY

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Why Link-Belt C class chains last longer in pulpwood handling

K-12 ATTACHMENT cushions C-132 chain on this horizontal conveyor from the constant pounding of hardwood logs being dropped by crane.

C-132 chain with K-12 attachment withstands heavy hardwood impact

Broad sliding surface of K-12 attachment protects Link-Belt C-132 chain against the terrific impact of heavy logs falling on this horizontal conveyor. K-12 attachment features sturdy wear shoe which absorbs shock and transfers it to track, minimizing stress on chain joints . . . adds greatly to conveyor life.

Popular for both conveying and elevating, C-132 chain combines cast center links with steel sidebars connected by steel pins . . . offers high strength and ample joint bearing area. Broad tops and bottoms provide long sliding surfaces for drag conveyors.

Many other center link and sidebar attachments are available to suit a variety of conveyor applications.

K-9 ATTACHMENT on this C-132 chain provides broad sliding surface—greatly increases wear life of chain.

C class chain available in Promal for extreme loads and abrasive wear

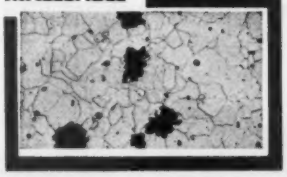
Specially heat-treated malleable iron provides extra wear resistance

The grueling day-in, day-out punishment of pulpwood conveying requires the added strength and greater wear resistance offered by Link-Belt's "file-hard" Promal C class chain. It's specifically designed to stand up under impact and abrasive abuse.

This rugged C class chain consists of Promal cast center links and steel sidebars connected by steel pins which are locked against rotation. The "file-hard" surface of the center links helps minimize conveyor shutdowns, replacement and maintenance costs.

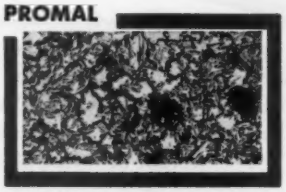
Promal is more than a partially annealed or surface hardened malleable iron. Developed by Link-Belt, this specially heat-treated malleable iron is actually transformed into a metal of radically different physical properties. Promal, because of uniform micro-structure throughout its whole section, provides greater ultimate strength, higher yield point, exceptional fatigue resistance and a remarkable ability to withstand abrasion.

MALLEABLE



White areas in malleable iron microphoto represent "free-iron," black is soft carbon nodules.

PROMAL



Dark areas in Promal structure show stronger, stiffer reinforcing material which strengthens metal.

These C class combination chains give efficient elevating service

C class combination chain is one of the most popular for pulpwood log elevator service. The cast center link and steel sidebar combination forms a strong, rugged, yet inexpensive elevating medium. Generous pin bearing surfaces within the barrels give good wearing life and durability. Attachments are available for both malleable iron or Promal center links and steel sidebars.

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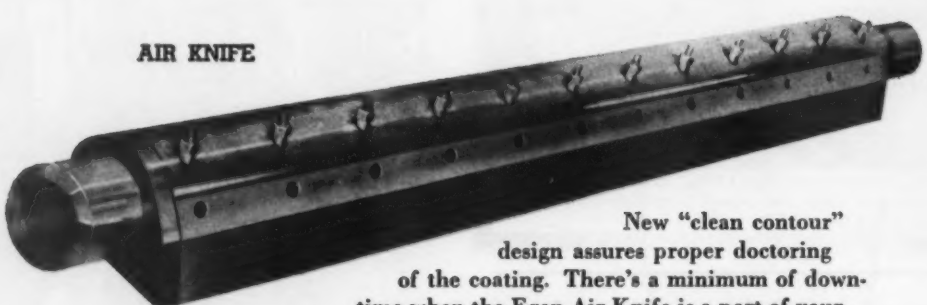

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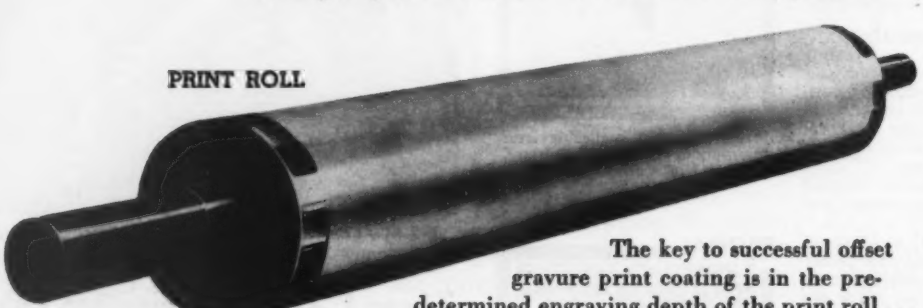

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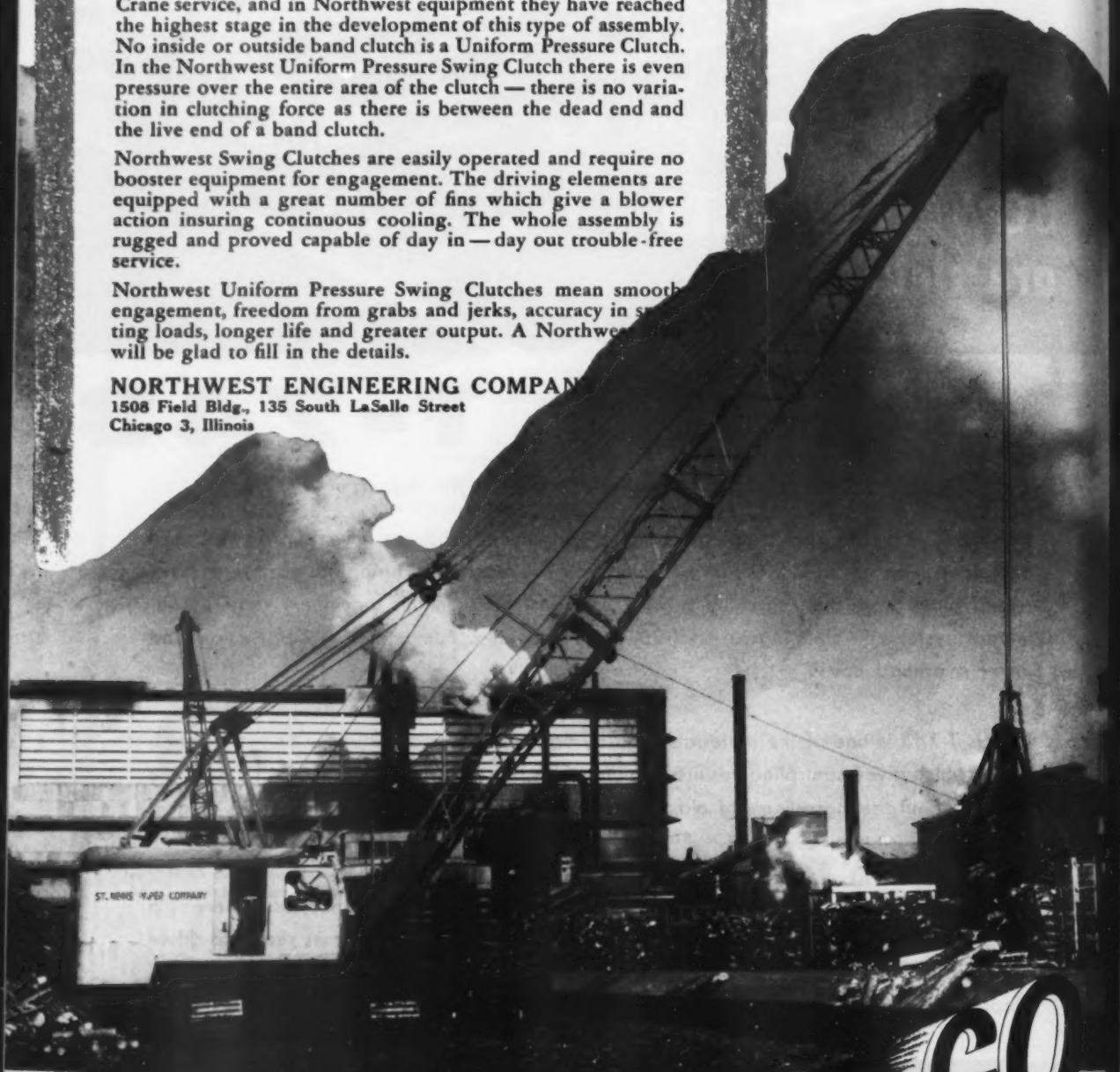

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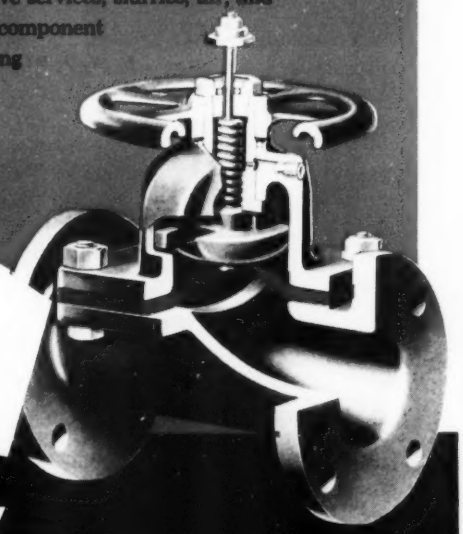

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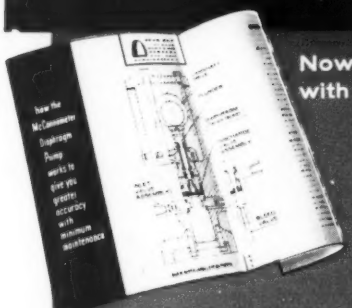

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Feature articles

New Gulf States' pulp mill uses continuous process

A. W. J. DYCK

The Kamyr continuous digester, the Impco multi-stage bleach system including two chlorine dioxide stages and the Beloit 234-in. wire fourdrinier insure the production of a uniform, high-quality sulfate pulp.

GULF STATES PAPER Corp.'s pulp mill that recently began operation at Demopolis, Ala., is in full production with a daily output of 300 tons or more of high quality, highly bleached sulfate pulp.

The new mill, one of the most modern of its kind, features the world's largest single continuous digester in which pulp quality can be controlled uniformly and accurately by way of a graphic control panel, a multi-stage bleach plant including two stages of ClO_2 bleaching, a 234-in. fourdrinier and pulp-drying machine and a pulp bale-conveying system that feeds a baling press, a wire-tying machine and a bale stacker.

Efficient utilization of equipment and manpower is insured by design and plant layout which incorporates maximum instrument control, and which groups related operations together.

Pulpwood handling

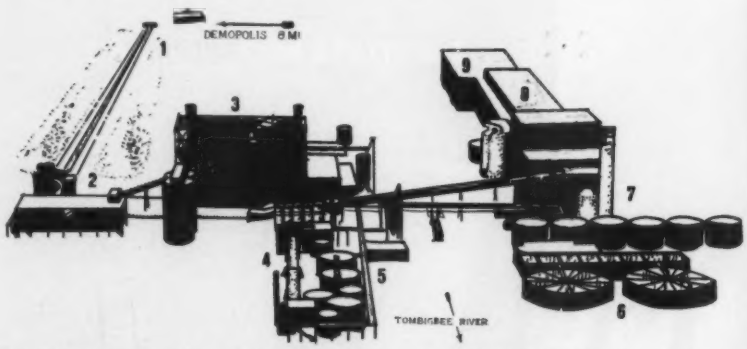
A locomotive crane running parallel to a 1250-ft. flume is used to unload the wood from the railroad cars to storage or into the flume as required, while a Gradall is used to push the logs from the railroad cars directly into the flume. The water in the flume, recirculated by an 11,000-gpm pump at a velocity of 5 ft./sec., is kept free of debris by being passed through a grit-collector and a 6-ft. traveling screen.

The chain and bucket type grit-collector is designed to remove up to 200 cu. ft./hr. of settled grit. It is provided with a four-speed transmission for flexibility of operation. Grit is discharged from the buckets (which are knuckled back after going over the head shaft to insure positive discharge) into Dempster Dumpster buckets, which are placed on rails inside the headshaft structure. The buckets handling 1000 lb./hr. of grit are removed by truck for dumping.

The traveling water screen has a maximum bark-handling capacity of 765 cu. ft./hr. The bark is sprayed off on the rear side of the screen and then sluiced to a perforated conveyor for disposal.

Logs arriving at the woodyard in trucks are unloaded by a 100-ft. stationary crane to storage, or directly into the flume if required.

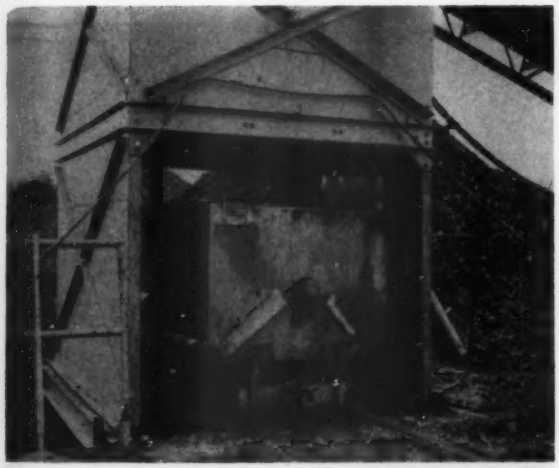
A three-strand chain log ladder receives logs from the flume and conveys them to a 12- × 68-ft. barking drum. The barked logs are carried by a single-strand chain transfer conveyor to the 72-in. wide sorting belt, from where three single-strand conveyors take (1) oversized logs to the splitter, (2) reject logs back to the barker and (3) accept logs to the 96-in., 12-knife chipper.



Aerial sketch of Gulf States Paper's new market pulp mill at Demopolis, Ala., illustrates the stages of operation at the $20,000,000 plant. Beginning at the woodyard (1) the wood is floated in the flume to the preparation area (2), where it is barked and chipped. Chips pass on a conveyor belt by the power and recovery house (3), the lime kiln and evaporators (4), the caustic section (5) and the water treatment plant (6) on the way to the digestion and bleaching stage (7). Stock is formed into sheets of pulp (8) which are shipped from platforms at the rear of the building next to the administrative offices (9).

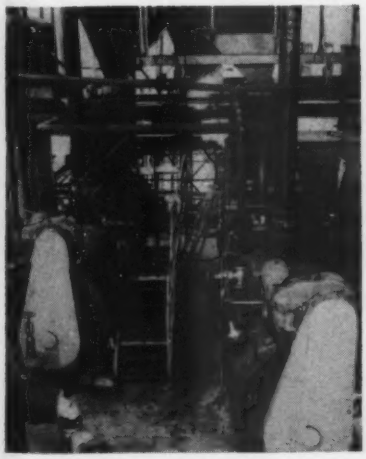
Warner & Swasey rail-mounted Gradall dumps pulpwood into the 1150-ft. flume.

Link-Belt 70-in. sorting belt conveyor where imperfectly barked logs are re-routed to the barker.

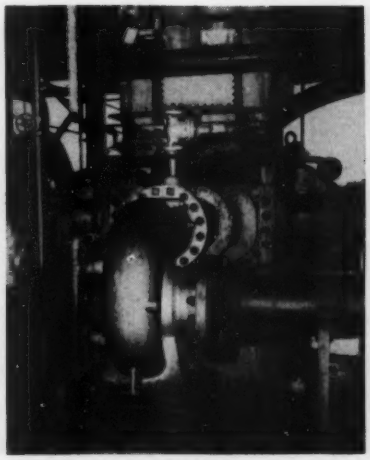


Grit from Chain Belt grit collector is collected in Dempster Bros. rail-mounted buckets for removal by a Dempster Dumpster truck.

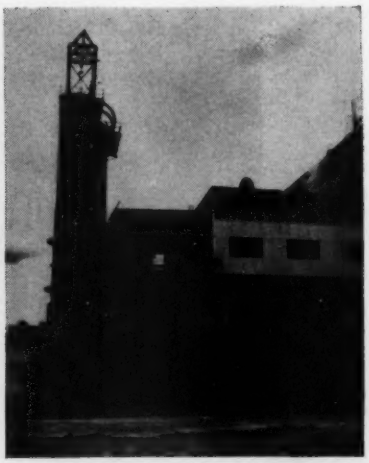
Part of Foxboro graphic panel controlling continuous digester process. A single worker operates digester section.



Two Kamyr 58-in. diameter by 24-ft. long steaming vessels.

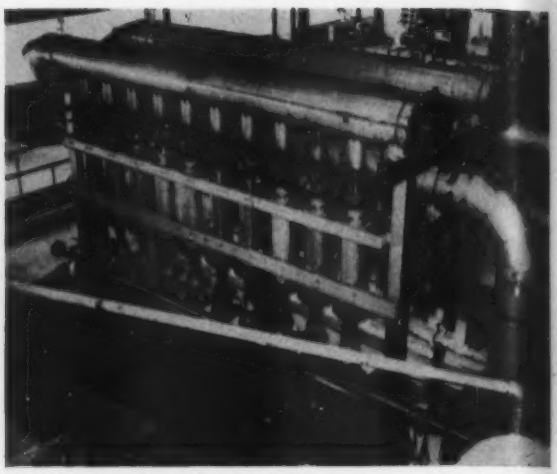


One of two Kamyr 35-in. by 42-in. high-pressure feeders.

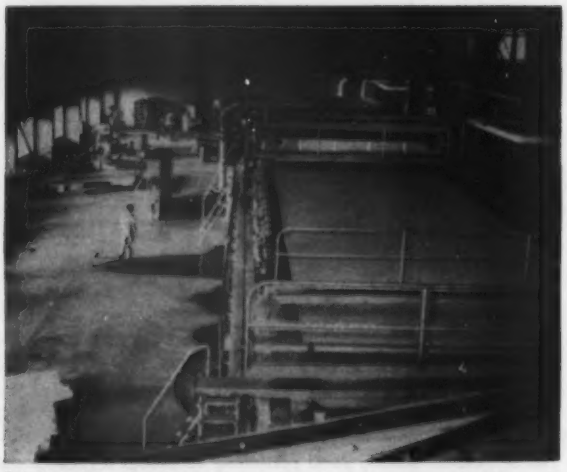


Kamyr continuous digester made by Chicago Bridge & Iron.

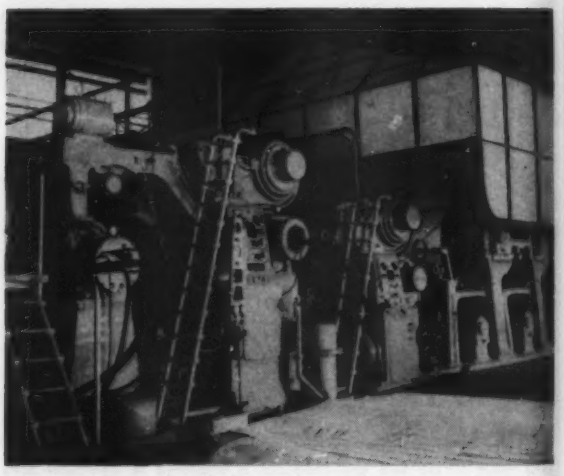
Highly bleached pulp from the Impco bleaching system is conveyed by Link-Belt conveyor to Chemical Linings high-density storage tanks.



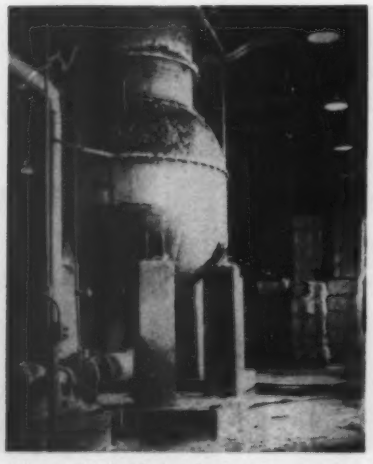
Nichols Engineering Vorject high-efficiency centrifugal cleaners insure a top-quality bleached pulp.



Beloit 234-in. fourdrinier is equipped with pressure headbox, 10 suction boxes, lumpbreaker and couch roll.



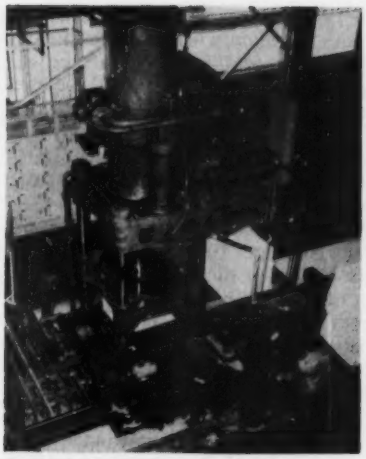
Beloit suction couch roll, first and second presses and pre-dryer section containing six 5-ft. diameter rolls.



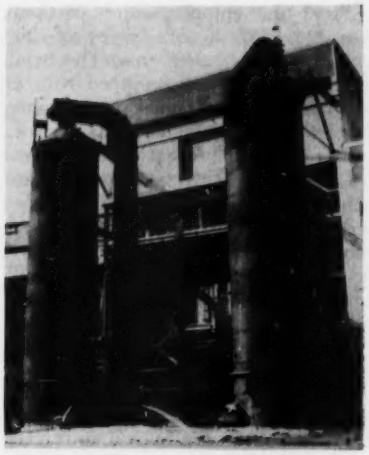
Morden Machines 1000-lb. Slushmaker, equipped with stainless steel tank and all-chrome steel pulping unit.

Pulp sheets from the Beloit cutter-slitter drop into stacks on the Matthews Conveyor layboy.

Stacks of pulp are automatically weighed, recorded, pressed and strapped on the Lamson conveying system.



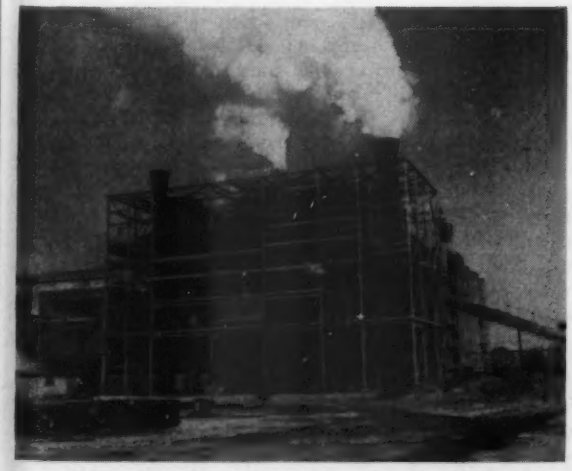
Baldwin-Lima-Hamilton 600-ton baling press equipped with a 23.8-gpm pump.



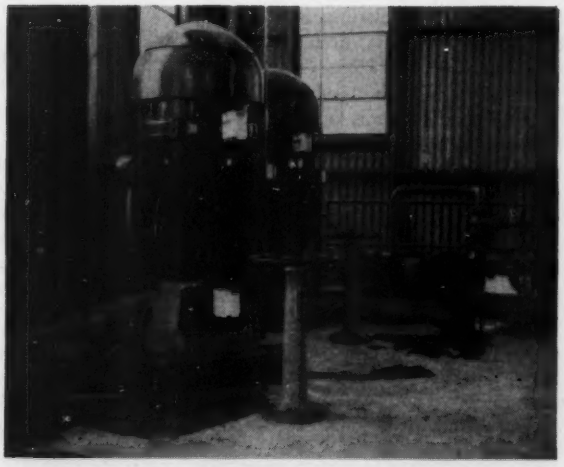
Chemical Linings polyvinyl chloride membrane-lined chlorine dioxide bleach towers.

Signode strapper ties 400-lb. bales of pulp on the Lamson conveying system.

The power house rises behind Dorr-Oliver recausticizing system and Goslin Birmingham evaporators.



Another view of Gulf States power house containing Babcock & Wilcox recovery and power boilers.



Two of four Worthington 5000-gpm pumps supply water from the Tombigbee River.

From the chipper, chips pass to two No. 522 Rotex screens of 20 units per hr. capacity each. The two-deck design screens, equipped with a mechanism for gyratory motion and subjected to the bouncing action of rubber balls to prevent blinding and clogging, effectively separate oversize chips, sawdust and dirt from the accepted chips. Accepted chips are conveyed by 36-in. wide belt conveyors and bucket elevators to two concrete silos. The bucket elevators are of the centrifugal discharge type and capable of handling 8000 cu. ft. of chips per hour. The silos are 30 ft. in diameter and 60 ft. high. They are equipped with rotary plate feeders featuring adjustable plows and feed a 30-in. belt conveyor, which carries the chips to a 24-in. diameter 17-ft. long screw conveyor serving the chip hopper of the continuous digester.

Continuous digester

From the chip hopper, chips are metered volumetrically by chip meters equipped with variable speed drive and fed through rotary low-pressure feeders into two low-pressure 58-in. diameter × 24-ft. long presteaming vessels.

From the low-pressure system the presteamed chips are introduced into the high-pressure system by two special rotary high-pressure feeders. Each feeder, 35-in. diameter and 42 in. wide and rotating at 3 rpm, is capable of feeding 3400 cu. ft. chips/hr. It provides a positive seal in any position and is perfectly balanced from a load standpoint.

In the high-pressure rotary feeder four separate ports extend through the plug. As the plug turns, chips are sluiced with circulating liquor into the vertical port where they are retained by a screen. At the same time, chips in the horizontal port are forced out by high-pressure circulating liquor into the top of the 90-ft. high and 13-ft. diameter digester. Here the mixture passes through a short tubular screen. The screened liquor is rerouted to the high-pressure feeder, while the chips, after being impregnated with liquor, move down the digester by gravity.

Fresh cooking liquor and some black liquor is pumped into the top of the digester by a high-pressure two-stage centrifugal pump that also holds the vessel under a hydrostatic pressure of 165 psi, or 30 psi above steam pressure. This high pressure prevents the flashing of steam behind the strainers and consequently insures excellent circulation.

Digester heating is carried out by circulating liquor horizontally through the chip columns in various heating zones beginning half way down and continuing to the bottom of the digester. The liquor is heated in two indirect steam heaters. Each of these vertical two-pass heat exchangers has approximately 1173 sq. ft. of heat transfer surface, and all metal parts in contact with the liquor are cast Esco Alloy 40-S (18-8 stainless steel) and wrought type 304 stainless steel. At the bottom of the digester black liquor is added just above the scraper to permit discharge of the pulp through a ball valve, strainer and selective orifice plate into the blow tank at 12-14 per cent consistency.

The continuous digester is completely controlled by instruments on a graphic panel. An interesting feature in instrument control involves the level control of digester steam heater condensate by a Type 13A d/p Cell Transmitter mounted on the condensate leg. Responding to any change in level, the transmitter sends a proportional 3-15 psi signal to a control valve in the condensate line. By this arrangement the level is kept low enough for efficient heating but not too low to enable steam to escape through the condensate line nor too high to cover a portion of the tubes and thereby reduce heating area.

The Gulf States mill is the first mill to be fully instrumented with compact, small case instruments that have the advantage of permitting a greater number of instruments to be mounted on a certain panel area than can be done with conventional instruments. The control system features pneumatic transmission of measurement signals from equipment to the panels, many new and unique transmitters, a high degree of standardization in the recording stations and controllers, quick interchangeability of parts, a minimum requirement of spare parts, twice-a-year inking service, 30-day reroll charts and convenient automatic-to-manual switching.

Turpentine and relief gases are recovered from the presteaming vessel by a turpentine recovery system incorporating a spiral heat exchanger made of type 304 stainless steel. This heat exchanger has 350 sq. ft. of surface, transmits 4,500,000 Btu/hr. and is designed for operating at 50-psi pressure.

Pulp washing and screening

From the blow tank pulp is pumped by an 8-in. stock pump to three vibratory deknotters and then to three 9½- × 16-ft. vacuum brown stock washers, all of which are arranged under an asbestos hood. The black liquor from the washers goes through a 7-ft. wide Waco filter where the remaining fiber is recovered.

The washed pulp is brought to 4-per cent consistency and then pumped by two 8-in. stock pumps from the two stock chests (one for softwood and one for hardwood) to five Lindblad screens arranged in parallel. The flow of stock to the screens is regulated by a magnetic flow meter. The screened stock is thickened in a 9½- × 14-ft. valveless vacuum decker and then pumped by an 8-in. stock pump at 3½-per cent consistency through a magnetic flow meter to the five-stage bleach system.

Pulp bleaching

Pulp is bleached in five stages:

(1) Chlorination at 3½-per cent consistency in an upward-flow 16- × 74-ft. chlorination tower;
(2) Caustic extraction at high density, elevated temperature in a downward-flow 16½- × 52-ft. caustic extraction tower;
(3) Chlorine dioxide treatment at high density and elevated temperature in a downward-flow 17- × 70-ft. chlorine dioxide tower;
(4) Caustic extraction at high density and elevated temperature in a downward-flow 16½- × 52-ft. caustic extraction tower, and
(5) Chlorine dioxide treatment at high density and elevated temperature in a downward-flow 17- × 70-ft. chlorine dioxide tower.

The chlorine dioxide towers are lined with a Koroseal plasticized polyvinyl chloride membrane with brick sheathing, while the chlorination tower and caustic extraction towers have a Chemliner lining.

Pulp is washed between stages and following the last bleaching stage in five 8- × 16-ft. washers provided with stainless steel or rubber surface wherever in contact with the paper stock. Also provided are rubber-covered press rolls where needed and self-contained hoods. Vats are of chemtile construction, seal tanks of Chemblox constuction, and pipes throughout the bleach plant are either rubber-lined or made of stainless steel.

Five 8-in. stock pumps are used to pump pulp from the bleaching stages and five 10-in. double-suction and four 6-in. double-suction pumps are used in bleach tower and washer dilutions.

Some interesting features of bleach plant instrumentation include: (1) the use of the 13 FA d/p Cell Transmitter for measuring the level of high-density stock in each of the bleach towers and the washer vats and (2) the use of the oxidation-reduction potential for controlling the addition of chlorine to the chlorination tower.

The flow of pulp stock to the chlorine dioxide washers and the flow of chlorine dioxide solution to the chlorine dioxide towers is measured in magnetic flow meters.

Chlorine dioxide is generated by the Olin Mathieson system from sodium chlorate, sulfur dioxide and sulfuric acid. Sulfur dioxide is produced in a jet-type sulfur burner equipped with sulfur atomizing nozzle in which air is used to atomize the sulfur. The burner also provides for intimate mixing of sulfur and combustion air by means of air inlets so that combustion is completed within the tubes of the burner, thus obviating the necessity of a large combustion chamber.

Chlorine dioxide is dissolved in cold water chilled to 45° F by a Chill-Vactor of 220-ton refrigeration capacity. The application of the Chill-Vactor or vacuum refrigeration to ClO_2 absorption in water serves a double purpose in so far as it both chills and deaerates the water to achieve a greater solubility of ClO_2. Maximum steam consumption of the unit is 3800 lb./hr., and condenser water requirement is 2100 gpm when the water to be cooled is at the maximum of 90° F. The ClO_2 solution is stored in a 15,000-gal. glass-lined steel "Chemstor" storage tank.

The pulp machine

Bleached stock, stored in two high-density storage tanks of pre-stressed tile construction, is pumped by an 8-in. stock pump at 3½-per cent consistency to a consistency regulator, where it is mixed with white water and consistency adjusted to 2½ per cent. From here it enters the 16-in. double-suction 10,000-gpm fan pump, which pumps it through 23 Vorject No. 610 centrifugal cleaners (19 primary, three secondary and one tertiary) to the machine-pressurized headbox. The headbox operates under partial vacuum and is equipped with distributor rolls, insuring the formation of a uniform long-fibered sheet.

The wet end of the pulp dryer is a 234-in. wire removable type fourdrinier equipped with 10 suction boxes, a soft rubber lumpbreaker roll and a suction couch roll.

The press section consists of three presses: (1) the first is a suction press with rubber-covered rolls; (2) the second is a plain press with rubber-covered botom roll and top microrok roll, and (3) the third press following six predryer rolls is a smoothing press with rubber-covered bottom roll and top microrok roll.

Vacuum in the suction boxes (up to 10 in. Hg.), the couch roll and the suction press is provided by five vacuum pumps.

The main dryer section has 42 dryers of 5-ft. diameter arranged in two sections.

The dryer drainage and steam control system is of the cascade type, the steam supply to the dryers being controlled by a moisture meter. The steam control system incorporates a unique break control arrangement whereby steam pressure is automatically lowered to a pre-determined setting whenever a break occurs in the pulp sheet.

Following the dryer section there is a reel that feeds the sheet to the cutter and slitter located at a lower level. A layboy stacks the sheets into piles, which are then conveyed to the bale-handling system.

Pulp broke is handled by a 1000-lb. "Slush-Maker" pulper driven by a 125-hp motor. The pulper is equipped with a Type A tank made of stainless steel, and the pulping unit is a Model C of all-chrome steel construction.

The pulp machine drive is of the mechanical differential type, the lineshaft being driven by a 1150-hp single-stage steam turbine designed for steam conditions of 550 psi inlet and 125 psi exhaust. A single reduction gear reduces the turbine speed of 5000 rpm to the lineshaft speed of 1000 rpm. A governor gear shift device holds speed variation of the turbine to 0.1 per cent of the rated speed over the designed speed range of 10:1.

Heating and ventilating system

The heating and ventilating system consists of the main dryer hood, which is totally enclosed and made of insulated aluminum; direct heat exchangers from the hood exhaust to white water; vapor absorption system under the hood; vapor absorption system under the roof, and air makeup supply units to the machine room.

The main hood is equipped with quick-opening electric motor-powered lift panels to provide easy access along the entire length of the dryer. Both ends of the hood are equipped with pneumatically-operated guillotine dampers, which when opened provide ample room for threading and a minimum opening during operation.

The direct-contact heat exchangers for white water heating are constructed of stainless steel. White water is heated by spraying it over a series of special baffles and allowing it to cascade counterflow to the exhaust air.

In the vapor absorption system under the hood hot dry air is distributed across the face of the dryers from cylindrical tubes equipped with special nozzles. These tubes are located throughout the machine in all vapor pockets. The capacity of this system is designed to balance the exhaust and to maintain the hood at approximately atmospheric pressure.

In the vapor absorption system under the roof hot dry air is introduced along the underside of the roof to prevent condensation. To complete the air balance to the machine room two other supply systems bring in outside air to the tending aisle and reel area.

Pulp conveying and baling system

At the layboy seven stacks of pulp are transferred simultaneously by a ram to a conveyor, which takes them to a belt conveyor mounted on a turntable. The turntable revolves through a 90° angle to deposit the stacks, in groups of three, on a belt conveyor leading to an automatic scale where the stacks are weighed individually.

A system of electric eyes and timers control both the turntable and the scale loading. As the seventh stack moves off the turntable, the latter is actuated by an electric eye which scans the belt conveyor and returns to its original position .

From the automatic scale the stacks move to the baling press equipped with top-cylinder platen, bottom platen, two side cylinders with prefill valve, filling tank and pump unit. The 23.8-gpm, 600-ton capacity DXP oil pump unit driven by a 40-hp motor has a hydraulic working pressure of 2850 psi and operates the press at a closing and opening speed of 230 in./minute. The conveyor stops automatically as each individual stack enters the press and starts again with the return stroke of the press.

At the next station of the conveyor under-wrappers and over-wrappers are applied to the bale, which is then sent to two wire-tying machines. Between the two wire-tying machines an electric ram actuated by a limit switch puts the bale into position for the second wire-tying machine. From here, the bales — which are automatically spaced 3 ft. apart — are conveyed by an indexing and storage conveyor to a single-bale upender. The upended bale then goes over a spacer belt to a stacker line roll upender which stacks 4-5 bales, as required, to form a pallet load.

The stacked bales then proceed via two other conveyorrs to the unloading point, where the pallet loads are removed by lift trucks for quick transfer to storage or shipping. The lift trucks are the G52 models of 3000-lb. capacity and equipped with forks.

Recovery system

Black liquor is pumped to the evaporators by corrosion-resistant type CNG chemical pumps made of high-nickel, high-chromium-molybdenum alloy. The evaporators constitute a six-body, sextuple effect unit that is completely

Principal equipment installed at Gulf States' Demopolis mill

Principal engineering consultants and contractors: H. K. Ferguson Co.

Pulpwood handling

Barking drum, 12 × 68 ft. ..... Carthage Machine Co.
Conveying system, logs and chips, single-strand conveyors, belt conveyor, bucket elevators of centrifugal discharge type ..... Link-Belt Co.
Chipper (1), 95-in., 12-knife ..... Carthage Machine Co.
Chip Screens, No. 522 Rotex, two-deck, 20 units/hr. capacity ..... Orville Simpson Co.
Crane, stationary ..... American Hoist and Derrick Co.
Gradall, for log unloading ..... Warner & Swasey Co.
Grit collector (1), Rex, 200-cu. ft./hr. capacity ..... Chain Belt Co.
Knife grinder, AK type, traveling wheel, 224-in., with hydraulic transmission ..... Hanchett Mfg. Co.
Log ladder, three-strand chain ..... Link-Belt Co.
Log-sorting belt conveyor, 72 in. wide ..... Link-Belt Co.
Log splitter, hydraulic ..... Carthage Machine Co.
Pump (1), flume water-circulating, 11,000-gpm ..... Fairbanks, Morse & Co.
Rechipper (1), 24-in. ..... Carthage Machine Co.
Rotary plate feeders (2), with adjustable plow ..... Link-Belt Co.
Traveling water screen (1), Rex, 765-cu. ft. capacity ..... Chain Belt Co.
Truck, Dempster Dumpster, with buckets for grit disposal ..... Dempster Bros. Inc.
Vibrators, Syntron electric, on chip bins ..... Syntron Co.
Weightometers ..... Builders-Providence Inc. Div., B-I-F Industries Inc.

Digester

Digester (1), continuous, 88 ft. high, Kamyr design ..... Chicago Bridge & Iron Co.
Digester heating system, three two-pass heat exchangers ..... Electric Steel Foundry Co.
Digester control system, graphic control panel featuring compact, small case instruments and pneumatic signal transmission ..... Foxboro Co.
Heat exchangers (3), spiral, specially designed, one 600 sq. ft. transm. 6,300,000 btu/hr.; two 300 sq. ft. transm. 10,000,000 btu/hr. each ..... Rosenblad Corp.
High-pressure feeders (2), rotary, 3 rpm, 35-in. diameter × 42 in. wide ..... Kamyr Inc.
Low-pressure feeders (2), rotary diameter ..... Kamyr Inc.
Pre-steaming vessels (2), 58-in. diameter × 24 ft. long ..... Kamyr Inc.
Pumps, liquor circulation ..... Bingham Pump Co.
Pumps, stock and white water ..... Warren Pumps Inc.
Turpentine recovery system, including stainless steel heat exchanger ..... Rosenblad Corp.

Pulp washing and screening

Brown stock washers (3), 9½ × 16 ft., vacuum type ..... Improved Machinery Inc.
Consistency regulators ..... DeZurik Corp.
Deknotters (3), vibratory ..... Improved Machinery Inc.
Disk refiner ..... Bauer Bros. Co.
Gear drives ..... Falk Corp.
Lindblad screens (5) ..... Improved Machinery Inc.
Magnetic flow meters ..... Foxboro Co.
Pumps, stock, 8-in. and 3-in. ..... Warren Pumps Inc.
Vacuum decker (1), valveless ..... Improved Machinery Inc.

Bleach system

Bleach towers (5), two lined with polyvinyl chloride membrane, three with Chemliner lining ..... Chemical Linings Inc.
Chill-Vactor, 220-ton refrigerating capacity ..... Croll-Reynolds Co. Inc.
Chlorine dioxide generator ..... Olin Mathieson Chemical Corp.
Chlorine dioxide storage tank, glass-lined ..... Pfaudler Co.
Instrumentation, including use of 13 FA d/p transmitter for level measurement and oxidation-reduction potential for controlling chlorine addition ..... Foxboro Co.
High-density storage tanks (2), pre-stressed construction ..... Chemical Linings Inc.
Magnetic flow meters ..... Foxboro Co.
Pumps, stock and double-suction; 6-in., 8-in., and 10-in. pumps ..... Warren Pumps Inc.
Seal boxes (5), Chemblox construction ..... Chemical Linings Inc.
Sulfur burner, jet type, with sulfur atomizing nozzle and air inlets ..... Chemipulp Process Inc.
Washers (5), 8 × 16 ft., provided with stainless steel or rubber surface ..... Improved Machinery Inc.
Washer vats (5), Chemtile ..... Chemical Linings Inc.

Pulp drying machine

Centrifugal cleaners (23), Vorject No. 610 ..... Nichols Engineering & Research Corp.
Cutter and slitter ..... Beloit Iron Works
Dryers, 42 cylinders, 5-ft. diameter ..... Beloit Iron Works
Dryer drainage and steam control system, cascade type ..... Ross Midwest Fulton Corp.
Fan pump (1), 10,000-gpm, 16-in., double-suction ..... Warren Pumps Inc.
Fourdrinier, 234-in. wire, removable, equipped with pressure headbox, 10 suction boxes, soft rubber lumpbreaker roll and suction couch roll ..... Beloit Iron Works
Heating and ventilating system, including dryer hood, direct heat exchangers, vapor absorption systems and air makeup supply units ..... Industrial Air Co.
Instrumentation ..... Foxboro Co.
Knife grinder, SK-24, for top and bottom slitter knives ..... Hanchett Mfg. Co.
Pre-dryer rolls (6), 5-ft. diameter ..... Beloit Iron Works
Press section, three presses ..... Beloit Iron Works
Pulp machine drive, mechanical differential, lineshaft driven by Westinghouse 1150-hp single-stage turbine ..... Beloit Iron Works
Pumps, stock and white water ..... Warren Pumps Inc.
Reel ..... Beloit Iron Works
Slush-Maker (1), 1000-lb., equipped with stainless steel tank and all-chrome steel pulping unit ..... Morden Machines Co.
Steam turbine, 1150-hp for lineshaft drive ..... Westinghouse Electric Corp.
Vacuum pumps (5) ..... Read-Standard Div., Capitol Products Corp.
Vacuum pump (1) ..... Nash Engineering Co.

Recovery system

Evaporators, six-body, sextuple-effect, equipped with flash tank ..... Goslin Brimingham Mfg. Co. Inc.
Evaporator control, featuring evaporator level control and evaporator density control ..... Foxboro Co.
Kiln, 9-ft. diameter, 250 ft. long, equipped with dust collector and Peabody scrubber ..... Traylor Engineering and Mfg. Co.
Kiln control panel and kiln draft control ..... Leeds & Northrup Co.
Pumps, CNG chemical, high-nickel, high-chromium-molybdmum alloy ..... Worthington Corp.
Recausticizing system, consisting of one 16 × 16-ft. primary slaker, one No. 8 slaker, three No. 12 causticizers, one white liquor clarifier and lime mud washer of two compartment design, one lime mud agitator, one green liquor clarifier and one dregs washer (both of unit compartment design), one lime storage bin, five No. six and 3 No. 2 suctions pumps ..... Dorr-Oliver Inc.
Recovery furnace, 300 ton/day-capacity, 169,000 lb. steam/hr., equipped with Venturi-evaporator-scrubber ..... Babcock & Wilcox Co.
Tall oil pumps (2), one 50-gpm and one 18-gpm ..... Viking Pump Co.

Steam and power generation

Bark-conveying system ..... Link-Belt Co.
Bark grinder, No. 12-CB M&M hogs ..... Mitts & Merrill
Conveyor scales, Conveyoflo Model CFAS, equipped with pneumatic force-balance system ..... Builders Providence Inc. Div., B-I-F Industries
Combustion control system, on power boiler and recovery furnace ..... Bailey Meter Co.
Feed water control, three-element system ..... Bailey Meter Co.
Motors, electric ..... Westinghouse Electric Corp.
Power boiler (1), 200,000 lb. steam/hr., designed to burn bark, gas, oil or coal ..... Babcock & Wilcox Co.
Power centers ..... Westinghouse Electric Corp.
Pumps ..... Warren Pumps Inc.
Pumps, desuperheater ..... Fairbanks, Morse & Co.
Recovery furnace, 169,000 lb. steam/hr. ..... Babcock & Wilcox Co.

Pulp-conveying system, equipped with turntable, automatic scale and electric eye system and timers for turntable and scale-loading control ..... Lamson Corp.
Stacker line bale upender ..... Lamson Corp.
Wire tying machines (2) ..... Signode Steel Strapping Co.

Water supply

Chemical proportioning pumps ..... Proportioneers Inc. Div., B.I.F. Industries Inc.
Demineralizing system, multi-bed, three cation and three anion units ..... Graver Water Conditioning Co.
Pumps (7), vertical, four 5000 gpm and three 6000 gpm ..... Worthington Corp.
Reactivators (2), 88-ft. diameter, 13,900-gpm capacity, equipped with four double-bay anthrafilt filters ..... Graver Water Conditioning Co.
Sand filters (8), gravity type ..... Graver Water Conditioning Co.
Strainer, self-cleaning type, 30-in. ..... Elliott Co.
Water storage tank ..... Chicago Bridge & Iron Co.

Soot-blowing systems, (2), one automatic sequential air motor-driven and controlled, including 10 Model I K retractable units and shot cleaning system on B&W recovery furnace; one manually operated, including two Model I K air motor-driven retractable units ..... Diamond Power Specialty Corp.
Switchgear, 5 kv ..... Westinghouse Electric Corp.
Turbine condenser, radial flow, 70,000 lb./hr. capacity ..... Westinghouse Electric Corp.
Turbine-generator, air-cooled, 12,500 kva ..... General Electric Co.
Turbine pumps, Type V ..... American-Marsh Pumps Inc.

Pulp conveying and baling

Baling press, equipped with 23.8-gpm pump developing 2850 psi hydraulic pressure ..... Baldwin-Lima-Hamilton Corp.
Layboy ..... Mathews Conveyor Co.
Lift trucks, G52 models, 3000-lb. capacity ..... Yale & Towne Mfg. Co.

self-supporting. The liquor from the fifth and sixth effects is combined and pumped to the fourth effect and then, counter-current to the vapor flow, through to the first effect. Following the first effect, the concentrated liquor is flashed into a flash tank for recovery of sensible heat, better steam economy and prevention of foam in the concentrated liquor storage tank. The design of the unit provides an economy of over 5 lb. of water vapor evaporated per 1 lb. of 40-psi steam used. Instrumentation on the black liquor evaporators features evaporator level controls and evaporator density controls.

Semi-concentrated black liquor is passed through a soap separation tank for tall oil recovery. The crude tall oil is pumped to storage in a 15,000-gal. tank by a 50-gpm and an 18-gpm pump driven through reduction gearing by a 2-hp and a 1-hp, 1800-rpm motor respectively.

Black liquor is burned in a 330-ton-per-day recovery unit designed to handle 990,000 lb. of solids per day and produce 169,000 lb. of steam per hour at 600 psi and 750°F. The recovery unit is equipped with a Venturi-Evaporator-Scrubber for cleaning flue gases, recovery of chemicals and for further concentration of black liquor. The evaporator-scrubber concentrates the 50-per cent solids black liquor from the multi-effect evaporators to 64-per cent solids prior to burning.

An automatic sequential soot-blowing system is provided to clean the recovery boiler. Included with the cleaning equipment is a shot cleaning system installed with the horizontal continuous economizer. It is a pressure lift system featuring two hoppers, two blow tanks and two control panels. Recirculated by 140-psi high-pressure air, the steel pellets entering the economizer dislodge the ash deposits from these tubes.

Instrumentation on the recovery unit includes total air-primary air ratio controls, black liquor-total air ratio controls, furnace draft controls and manual tertiary air control.

Worthite chemical pumps are used throughout the black liquor-handling system.

(Continued on page 32)

Demopolis mill management of Gulf States Paper Corp.

J. W. Warner
President

H. P. Halsell
Res. Mgr.

Karl Guest
Op. Mgr.

J. Tucker
Chief Engr.

W. A. Robinson
Supt. Pulp Mill

W. R. Adams
Proc. Eval.

D. C. Bond
Mat. Control

W. L. Speas
Adm. Sup.

W. B. Harrell
Proc. Chemist

S. Lanier
Pers. Dir.

W. J. Miles
Maint. Sup.

A. B. Lindsey
Instr. Supt.

The use of pipe, fittings, valves and pumps in the pulp and paper industry

ROLAND L. ALLEN JR.
Vice President, Eastern Engineering Co.

Part 1—Discussion of available materials—pipes and fittings

▶ Part I in this issue discusses installed costs of materials and such materials as carbon steel, ferric alloy, stainless steel, wrought iron and cast iron.

Preface

THE PULP AND PAPER industry is a large user of pipe, fittings, values and pumps. They comprise a significant portion of the cost of a new mill. In fact, in a complete mill between 10 and 15 per cent of the total cost is pipe, fittings, and valves. For the several areas of a mill (machine room, stock preparation, digesters, washers, bleach plant, bleach liquor-making, etc.) the piping costs will vary from about 10 to 15 per cent of the area total equipment cost to about 80 to 85 per cent. The 10 to 15 per cent figure applies to a paper machine with its auxiliary equipment, while the 80 to 85 per cent figure applies to a chlorine dioxide-making system.

The pulp and paper industry does not have a set of standards for piping materials, and there is not available a good handbook on pulp and paper mill piping.

This series of articles is not an attempt to supply this deficiency, but is intended to present information on the materials currently available to the industry and to discuss the application of these materials to the various systems found in pulp and paper mills.

The American Standards Association's "Code for Pressure Piping" (ASA B31.1) covers piping for Power Piping Systems, Industrial Gas and Air Piping Systems, Refinery and Oil Transportation Piping Systems, District Heating Piping Systems, Refrigeration Piping Systems and Gas Transmission and Distribution Piping Systems. In pulp and paper mills this code should be used where it specifically applies. In the absence of an industry standard it is suggested that piping at other points in the mill be designed in accordance with the code where it contains information on the materials being used. Where materials that are not contained in the code are used in services not covered by the code the system should be judiciously designed with the code rules in mind.

For piping connected to boilers, the portion between the boiler and the second stop valve in the line should be designed in accordance with the American Society of Mechanical Engineers Boiler and Pressure Vessel Code Section 1—Power Boilers.

Most piping materials are manufactured in accordance with dimensional standards established by the American Standards Association and in accordance with specifications established by the American Society for Testing Materials for method of manufacture, composition of material, physicial characteristics, methods of testing, etc. There are still some piping materials that are not covered by either ASA Standards or ASTM Specifications or both. Some of these are covered by standards established by the Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS). When piping materials are specified or purchased the ASA Standard and the ASTM Specification should be clearly stated.

As stated above, these articles will not be in the form of a handbook since a complete set of charts, tables, etc. would require much more space than is available. Such information can be readily obtained elsewhere. Where possible, some charts, tables, drawings and pictures will be shown. A list of reference sources that should be included in an enginering library is given at the end of Part 1.

PIPE AND FITTINGS are available in a wide variety of sizes, types, weights and materials, and the modern pulp and paper mill utilizes some of practically everything available. In selecting a piping material for an application consideration must be given to the service conditions (pressure, temperature, the corrosive character of the product handled, the importance of contamination of the product handled and the ambient conditions where the piping is to be installed) and the economics of the use of the material.

The economics of the selection of a piping material has many facets. Of major importance are the service life of the material and the installed cost. The selection of a more expensive piping material is warranted if its service life is increased over that of a less expensive piping material by a greater percentage than its percentage of increase in installed cost. It should be noted that the installed cost of a piping material is emphasized. The installed cost is the sum of the cost of the piping material itself, the cost of the supports and accessories required to install it and the cost of the labor to install the piping material and its accessories and to support them in the manner required for the particular piping material.

Some piping materials are cheap in comparison to others but require so much more supporting, so many more accessories or so much more labor that their installed costs are actually higher. There are many ways this can occur. For example, everyone's first reaction when asked the relative costs of black steel piping (carbon steel) and type 304 ELC stainless in the thin wall thicknesses usually employed in the pulp and paper industry would be to say that the black steel would be appreciably cheaper. For the average pipe run they would be correct, but if the pipe run had very litle straight pipe and a larger than average number of fittings then their answer might be wrong. The reason for this is that the stainless fittings cost less than those for carbon steel. To illustrate this, we will compare the material and labor costs of a 12-in. standard weight carbon steel 90° welding elbow with a 12-in. type 304 ELC 90° welding elbow with a 0.109-in. thick wall. Both elbows have the same dimensions except wall thickness.

	304 ELC (0.109 wall)	Carbon Steel (0.375 wall)
Elbow	$ 64.43	$ 75.56
Handling Labor	28.32	28.32
2 Butt Welds	56.64	56.64
	$149.39	$160.52

For 6-in. size

	304 ELC (0.109 wall)	Carbon Steel (0.280 wall)
Elbow	$26.02	$12.41
Handling Labor	14.16	14.16
2 Butt Welds	28.32	28.32
	$68.50	$54.89

For 24-in. size

	304 ELC (0.140 wall)	Carbon Steel (0.375 wall)
Elbow	$249.56	$296.12
Handling Labor	56.64	56.64
2 Butt Welds	94.40	94.40
	$400.60	$447.16

The breaking point is the 10-in. size. The prices are typical prices charged by piping contractors for materials and labor. Some contractors will charge more and others less. The prices include contractor's costs for material, labor, freight, use and sales taxes, profit, payroll taxes and insurance, use of tools and equipment, supervision, overhead, scaffolding, unloading, testing, etc. Any prices given later in these articles will be on the same basis.

In the next column is a list of typical installed costs per foot for straight pipe in 4-in. nominal sizes. It represents total labor and material cost except the material cost of necessary hangers and supports.

These comparisons, although not in great detail, show that the economic evaluation of piping materials requires much study. Sweeping statements as to the relative costs of piping materials cannot be made. Each situation must be evaluated.

Caution should be used in evaluating the corrosion resistance of piping materials under service conditions that are even slightly different from those for which the corrosion resistance of the piping material are known. The corrosion resistance of a piping material to a particular solution may be affected by changes in the concentration or temperature (or both) of the solution handled. Extreme care should be exercised in the matter of making interpolations or extrapolations between known corrosion resistance data for even slightly different piping materials and solutions.

Total	Material	Labor	
$7.30	4.60	$2.70	4" - Sch. 80 Polyvinyl Chloride Pipe, Unplasticized, Normal Impact. 4½" O. D. & 0.337" Wall Thick.
$9.71	7.02	$2.69	4" - Saran Lined Steel Pipe 4½" O. D. & 3 5/8" I. D.
$6.82	4.37	$2.45	4" - ASTM A312 Type 304 ELC Stainless Steel Pipe. 4½" O. D. & 0.083" Wall Thick.
$8.76	6.31	$2.45	4" - ASTM A312 Type 316 ELC Stainless Steel Pipe. 4½" O. D. & 0.083" Wall Thick.
$9.27	6.82	$2.45	4" - ASTM A312 Type 317 Stainless Steel Pipe. 4½" O. D. & 0.083" Wall Thick.
$17.72	15.27	$2.45	4" - ASTM A312 Carpenter No. 20 Stainless Steel Pipe. 4½" O. D. & 0.083" Wall Thick.
$5.72	1.17	$2.55	4" - Sch. 40 ASTM A53 Seamless Carbon Steel Pipe (Std. Wt.) 4½" O. D. & 0.237" Wall Thick.
$4.83	1.90	$2.93	4" - Sch. 80 ASTM A106 Seamless Carbon Steel Pipe (X. Strong Wt.) 4½" O. D. & 0.337" Wall Thick.
$7.18	4.25	$2.93	4" - Sch. 80 ½% Chrome, ½% Moly, Alloy Seamless Pipe. ASTM A335, Grade P2 4½" O. D. & 0.237" Wall Thick.
$4.85	2.30	$2.55	4" - Std. Wt. Wrought Iron Pipe 4½" O. D. & 0.237" Wall Thick.
$4.05	1.50	$2.55	4" - Sch. 40 ASTM A120 Galvanized Carbon Steel Pipe (Std. Wt.) 4½" O. D. & 0.237" Wall Thick.
$4.76	2.06	$2.70	4" - Sch. 40 ASTM B241 Alloy M1A Seamless Aluminum Pipe (Std. Wt.) 4½" O. D. & 0.237" Wall Thick.
$7.15	4.20	$2.95	4" - Copper Water Tube Type L ASTM B88, Seamless Deoxidized Copper, Hard Temper 4 1/8" O. D. & 0.110" Wall Thick.

To do so might result in the rejection of a piping material that would give satisfactory service or the acceptance of a piping material that would fail in service. One example of this that occurs in a pulp mill bleach plant is in the handling of the unwashed pulp from the chlorine dioxide bleach tower to the chlorine dioxide bleach washer and the filtrate from this washer. Type 317 stainless steel has been found to give very satisfactory service at this point. When type 316 stainless steel is used it fails in from a few weeks to a few years depending upon how much the residual chlorine dioxide is buffered. Yet, the analyses of the two are only slightly different as can be seen below:

	316	317
Carbon, % max.	0.08	0.08
Manganese, % max.	2.00	2.00
Phosphorus, % max.	0.40	0.40
Sulfur, % max.	0.30	0.30
Silicon, % max.	0.75	0.75
Nickel, %	11.00 to 14.00	11.00 to 14.00
Chromium, %	16.00 to 18.00	18.00 to 20.00
Molybdenum, %	2.00 to 3.00	3.00 to 4.00

It is apparent after inspecting the above analyses that there is a possibility that type 316 stainless steel might be made with both 18 per cent chromium and 3 per cent molybdenum and the resulting alloy have the minimum quantities of these constituents required for 317 stainless steel and could be so classified. Actually, this possibility is so remote as to make its happening a near impossibility. There is little chance that either the chromium or the molybdenum would occur in type 316 stainless steel at the higher end of the allowable range since these are costly elements and the steel mills must be sparing with them. For both to be at the higher end of the range is even less likely.

Since corrosion is a vast field in itself, no additional discussion of this aspect of piping material selection will be presented, and we will move on to a brief discussion of the various piping materials available.

Carbon steel pipe and fittings

Carbon steel is the basic material of construction for pipe and fittings in all process industries. The pulp and paper industry, being a process industry, is one of the large users of carbon steel piping.

Carbon steel pipe has the advantage of being economical, strong, made in a large variety of sizes and wall thicknesses and is in abundant supply. It is satisfactory for a wide range of service pressures and temperatures. These service pressures and temperatures will be discussed later.

Carbon steel pipe is manufactured to the dimensional standards dictated by American Standard Wrought-Steel and Wrought-Iron Pipe (ASA B36.10-1950). This standard applies to steel pipe not steel tubing.

Fig. 1 shows the pipe sizes and dimensions of wrought-steel pipe covered by ASA B36. 10.

In addition to the ASA dimensional standard, the pipe is manufactured in accordance with a variety of material and method of manufacture specifications published by the American Society for Testing Materials. The main ones are ASTM specifications A53, A106, A120, A134, A135, A139 and A155. These specifications specify such things as the process by which the steel is to be made (open-hearth, etc.), the process by which the pipe is to be made (seamless hot drawn, etc.), the chemical composition of the steel, ladle analysis of the steel, check analysis of the finished pipe, tensile properties of the pipe, the bending properties of the pipe, flattening tests to be conducted on the pipe, hydrostatic tests on the pipe, the number of tests to be made on each lot of pipe, the permissible variations in weight and dimensions, the lengths in which the pipe is made, the type of pipe ends, the pipe finish, the marking of the pipe and inspection and rejection provisions.

A106 and A155 pipe may be used in the most severe services where the Piping Code allows the use of carbon steel piping materials. A106 is seamless pipe, while A155 is electric fusion welded pipe. A106 is made in sizes 24 in. and smaller, while A155 is normally made only in sizes 16 in. and larger. The Piping Code allows the use of A53 pipe over the same temperature ranges as A106 and A155 but limits its use to 600 psig maximum pressure. A53 is made in butt welded, lap welded, electric resistance welded and seamless types and can be obtained in black or galvanized pipe 24 in. and smaller. A120 pipe is limited by the Piping Code to 125 psig and 450° F maximum. A120 pipe is made in butt welded, lap welded, electric welded and seamless types both black and galvanized and is normally made in sizes 12 in. and smaller. Both A134 and A139 pipe can be used, in accordance with the Piping Code, for service over the full temperature range but are limited to 250 psig maximum pressure. Both are electric fusion (arc) welded pipe. A134 is made in sizes 16 in. and larger with a maximum of ¾-in. wall thickness, while A139 is made in sizes 4 in. and larger with a maximum wall thickness of ⅝ in. A135 is electric resistance welded pipe made in sizes 30 in. and smaller and can be used over the entire Piping Code temperature range but at a maximum pressure of 600 psig. The Boiler Code allows the use of A53, A106, A135 and A155 pipe.

Neither the Boiler Code nor the Piping Code make it mandatory that the use of carbon steel pipe be limited to any particular maximum service temperature, but since both point out that prolonged exposure to temperatures above 775 or 800°F may cause the carbide phase of carbon steel to be converted to graphite, normal practice is to limit the use of carbon steel to service temperatures below 775°F.

Naturally, where pipe is used pipe fittings are needed. These too are manufactured in accordance with

Fig. 1—Outside Diameter and Nominal Wall Thickness, Wrought Steel Pipe ASA B-36.10

Pipe Size	O. D.	Stand. Wall	Extra Strong Wall	Dbl. X. Strong Wall	Schedule Number									
					10	20	30	40	60	80	100	120	140	160
⅛	.405	.068	.095	–	–	–	–	.068	–	.095	–	–	–	–
¼	.540	.088	.119	–	–	–	–	.088	–	.119	–	–	–	–
⅜	.675	.091	.126	–	–	–	–	.091	–	.126	–	–	–	–
½	.840	.109	.147	.294	–	–	–	.109	–	.147	–	–	–	.187
¾	1.030	.113	.154	.308	–	–	–	.113	–	.154	–	–	–	.218
1	1.315	.133	.179	.358	–	–	–	.133	–	.179	–	–	–	.250
1¼	1.660	.140	.191	.382	–	–	–	.140	–	.191	–	–	–	.250
1½	1.900	.145	.200	.400	–	–	–	.145	–	.200	–	–	–	.281
2	2.375	.154	.218	.436	–	–	–	.154	–	.218	–	–	–	.343
2½	2.875	.203	.276	.552	–	–	–	.203	–	.276	–	–	–	.375
3	3.500	.216	.300	.600	–	–	–	.216	–	.300	–	–	–	.438
3½	4.000	.226	.318	–	–	–	–	.226	–	.318	–	–	–	–
4	4.500	.237	.337	.674	–	–	–	.237	–	.337	–	.438	–	.531
5	5.563	.258	.375	.750	–	–	–	.258	–	.375	–	.500	–	.625
6	6.625	.280	.432	.864	–	–	–	.280	–	.432	–	.562	–	.718
8	8.625	.322	.500	.875	–	.250	.277	.322	.406	.500	.593	.718	.812	.906
10	10.750	.365	.500	–	–	.250	.307	.365	.500	.593	.718*	.843	1.000*	1.125*
12	12.750	.375	.500	–	–	.250	.330	.406	.562*	.687	.843	1.000	1.125*	1.312
14	14.000	.375	.500	–	.250	.312	.375	.438	.593*	.750	.937	1.093*	1.250*	1.406*
16	16.000	.375	.500	–	.250	.312	.375	.500	.656	.843	1.031	1.218	1.437*	1.562*
18	18.000	.375	.500	–	.250	.312	.437	.562	.750	.937*	1.156	1.375*	1.562*	1.781*
20	20.000	.375	.500	–	.250	.375	.500	.593	.812	1.031	1.281*	1.500*	1.750*	1.968*
24	24.000	.375	.500	–	.250	.375	.562	.687	.968	1.218*	1.531*	1.812*	2.062*	2.343*
30	30.000	.375	.500	–	.321	.500	.625	–	–	–	–	–	–	–

*Not made unless certain minimum tonnage ordered.

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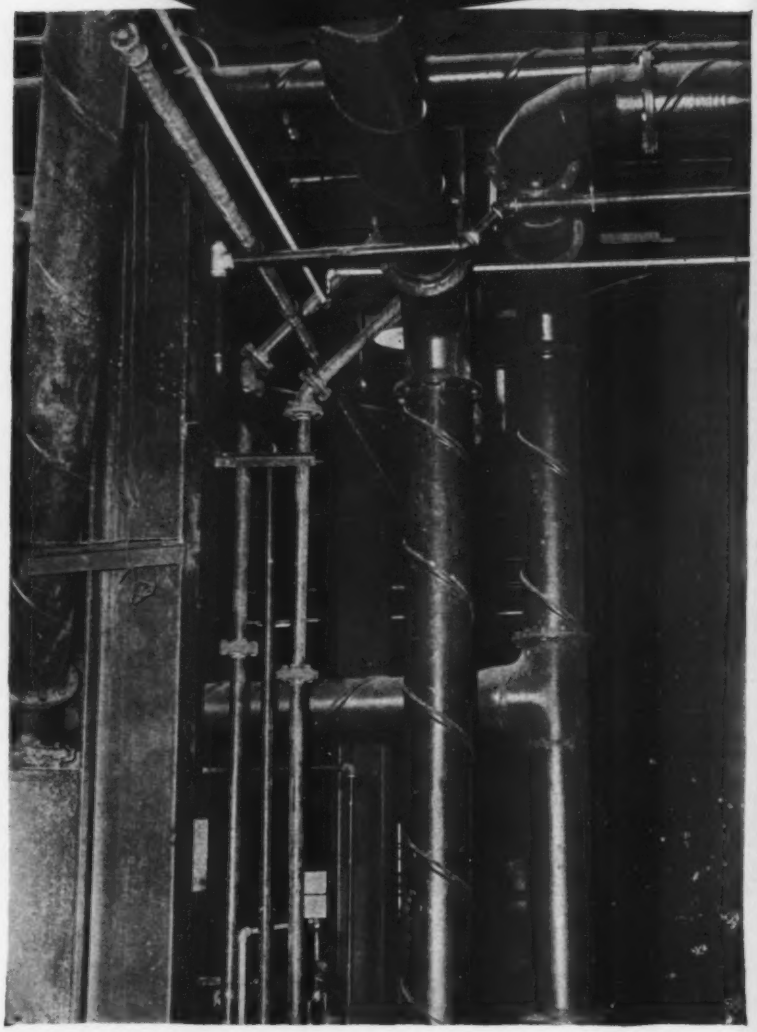

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ASA standards and ASTM specifications. Carbon steel fittings are made in butt welding, socket welding, screwed and flanged types. The butt welding type is normally made in wrought or cast forms. The wrought form may be either seamless or seam welded. Butt welding fittings are made to ASA B16.9 dimensions in accordance with ASTM A234 for wrought fittings and ASTM 216 for cast fittings. The socket welding fittings are made in accordance with ASA B16.11 and ASTM A105 and are normally forged. Screwed steel fittings are not covered by an ASA standard but are normally made to the same specifications as the forged socket welding fittings. These fittings are forged solid and then bored to the proper inside diameter. For socket welding fittings the fitting ends are machined to form the socket. On screwed fittings the ends are internally threaded rather than machined with sockets. Flanged steel fittings are normally cast. They are made in accordance with ASA B16.5 and ASTM A216.

Where piping is to be connected to flanged valves, fittings or equipment, pipe flanges are needed. These are normally forged or rolled and for carbon steel are made in accordance with ASA B16.5 and ASTM A181. Carbon steel flanges and flanged fittings are made in 150-, 300-, 400-, 600-, 900-, 1500- and 2500-lb.

Ferric alloy steel pipe and fittings

Ferric alloy steel pipe is being increasingly used in pulp and paper mill power plants. Although used for many years in public utility steam power generating plants, its use in pulp and paper mills was almost unknown a few years ago. In the last several years more and more paper mill power plant main steam systems have crossed over the upper temperature limit, and many paper mills now have main steam temperatures between 800 and 900°F, and some are in the 900 to 1000°F zone.

Ferric alloy steel pipe is made in 14 grades of low and intermediate alloy steels containing from zero up to a maximum of 10 per cent chromium. One grade contains no chromium. All grades contain from approximately 0.5 per cent to approximately 1 per cent molybdenum. The carbonmoly grade is subject to graphite formation at temperatures above 875°F, and one grade of chromemoly that can have a chromium content of less than 0.6 per cent is subject to graphite formation at temperatures above 975°F.

Since the public utility plants have almost all exceeded the temperatures where carbonmoly is normally used, this piping material is becoming more difficult to obtain unless a mill order of a certain minimum tonnage is obtained. These minimum tonnages are far more for most sizes than the average pulp and paper mill needs, and this together with carbonmoly's narrow service temperature range keeps it from being used in many cases. The chromemoly grades are more readily obtainable and therefore used more.

The ferric alloys are made in accordance with several ASTM specifications, but ASTM A335 is the specification most used in pulp and paper mill work. A335 pipe is made to the same dimensions as carbon steel pipe (ASA B36.10).

Ferric alloy flanges and fittings are made to the same dimensions as those for carbon steel. They are most commonly made in accordance with ASTM A182 and ASTM A234.

Stainless steel pipe and fittings

Stainless steel is made in a wide variety of alloys, some satisfactory for piping, others unsatisfactory. The alloys of importance in pulp and paper mill service fall in the American Iron and Steel Institute's series 300 chromium-nickel stainless steels. Types 304, 316 and 317 are the most used. Types 304 and 316 are also made in extra-low carbon grades (ELC). This extra low carbon content (0.3% max.) greatly reduces the possibility of carbide precipitation at welds. Carbide precipitation greatly reduces the corrosion resistance of the stainless steels, and where welded construction is used in corrosive services the added expense of the ELC grades is warranted. Since most stainless steel piping in pulp and paper mills is thin wall and made from sheet, the increase in sheet cost for ELC grades is significant. The type 304 ELC sheet costs about 15 per cent more than type 304. The type 316 ELC sheet costs about 10 per cent more than type 316. This increase in sheet costs, of course, results in an increase in the cost of the ELC grades of pipe. Type 304 ELC pipe costs 7 to 8 per cent more than type 304 pipe and type 316 ELC pipe costs 10 to 11 per cent more than type 316 pipe.

The following is a table of stainless steel pipe wall thicknesses that will allow working pressures of about 100 psig and utilize standard stainless steel sheet thicknesses:

Pipe Sizes	Wall Thicknesses
3", 3½" & 4"	- 0.083 inch
5", 6", 8", 10" & 12"	- 0.109 inch
14", 16" & 18"	- 0.125 inch
20" & 24"	- 0.140 inch

The following table is a comparison between the cost of standard weight carbon steel piping materials and type 304 ELC, type 316 ELC and type 317 stainless steel piping materials of the thicknesses given in the paragraph above. The carbon steel flanges are 150-lb. forged steel slip-on type, while the stainless steel flanges consist of a lap joint ring of the same thickness as the pipe (⅛-in. min.) with a carbon steel plate back-up flange ½ in. thick for sizes 3, 3½, 4 and 5 in.; ⅝ in. thick for sizes 6, 8, 10 and 12 in.; ¾ in. thick for sizes 14, 16 and 18 in., and 1 in. thick for sizes 20 and 24 in.

Average Relative Costs—
Sizes 3 in. through 24 in.

	Carbon Steel	304 ELC	316 ELC	317
Pipe	1.000	3.647	5.123	5.596
90° Ells	1.000	0.875	1.134	1.195
Flanges	1.000	0.569	0.584	0.588

Average Relative Costs—
Sizes 3 in. through 10 in.

	Carbon Steel	304 ELC	316 ELC	317
Pipe	1.000	3.701	5.288	5.836
90° Ells	1.000	1.609	1.965	2.004
Flanges	1.000	1.124	1.181	1.185

Average Relative Costs—
Sizes 12 in. through 24 in.

	Carbon Steel	304 ELC	316 ELC	317
Pipe	1.000	3.630	5.072	5.523
90° Ells	1.000	0.796	1.045	1.108
Flanges	1.000	0.503	0.513	0.610

Stainless steel pipe should be made to the same outside diameters as carbon steel pipe, and stainless steel fittings should have the same over-all dimensions as carbon steel fittings. The pipe should be made in accordance with ASTM A312.

Great care should be used in the selection of a welding method. Any of the inert gas shielded arc methods give good results. Other methods can be used with equally good results if the welding personnel is adequately trained in their use.

Where possible, all stainless steel pipe should be prefabricated in a shop in convenient sections and pickled and passivated before being moved to the site where it is to be erected. The fabrication work can be done with more care in a shop, and the fabrication labor generally costs less. Pickling and passivating will remove any foreign matter that can accelerate corrosion and produces a corrosion-resistant film on the surface.

Stainless steel piping materials are used in two distinctly separate general classes of service in pulp and pa-

(Continued on page 32)

Chemical utilization of lignins*

IRWIN A. PEARL

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The Institute of Paper Chemistry

Uses based on the dispersing and chemical properties of lignosulfonates and alkali lignins are described, as well as various processes for the recovery of chemicals from lignins.

FOR MANY YEARS lignosulfonic acids were available commercially only in the form of crude spent sulfite liquor. The status of commercial availability of lignosulfonates changed somewhat when about 20 years ago Marathon Corp. introduced the Howard lime precipitation process for the isolation of basic calcium lignosulfonate from spent sulfite liquor. With the use of this process, Marathon produced essentially carbohydrate-free lignosulfonic acid material and offered this purified lignin product to commerce in a number of forms for a variety of uses.

During the last war Ontario Paper Co. Ltd. of Thorold, Ont., and Puget Sound Pulp & Timber Co. of Bellingham, Wash., began the fermentation of coniferous spent sulfiite liquors to ethanol. The residual spent liquors from the ethanol fermentation are desugared to the extent of 65-70 per cent, leaving a partially purified lignosulfonate material that is commercially available.

In the two torula yeast production plants that have been put into operation by Rhinelander Paper Co. and Charmin Paper Products Co. the spent sulfite liquors are desugared to the extent of 90-95 per cent, leaving a lignosulfonate solution almost free of carbohydrate materials.

Currently, two recently developed processes for producing carbohydrate-free lignosulfonates are being considered for commercial development. The first is a reactive solvent extraction process of spent sulfite liquor solids with acid acetone to remove sugars as di-o-isopropylidene derivatives. In this process several lignosulfonate materials of varying molecular weight are obtained as by-products. In the second process spent sulfite liquor is fractionated into lignosulfonate and carbohydrate fractions by means of ion-exchange resins.

Uses based on dispersing properties

Purified lignosulfonates have found a wide variety of industrial applications as a result of their dispersing properties. They have been found effective in their ability to control the fluidity of oil well drilling muds.

Purified lignosulfonates are exceptional dispersing agents for carbon black and are employed in the production of black masterbatched GRS rubber. They are used in the manufacture and application of vat dyestuffs in the textile industry and result in speck-free, level color distribution. Wettable pesticide powders are formulated into agricultural sprays and maintained in uniform suspension during spraying by means of lignosulfonates. Lignosulfonates are employed in industrial cleaning compositions to prevent redeposition of suspended soil and to promote free-rinsing of the cleaned surfaces. They are used as clay deflocculants in the manufacture of brick, tile, refractories, pottery and porcelain ware.

Purified lignosulfonates have proved more effective than spent sulfite liquor as ore flotation agents. They act as dispersants for such minerals as calcite, barite, talc, sericite, molybdenite and carbonaceous material such as graphite. In floating copper sulfides, lignosulfonates improve both grade and recovery of copper concentrates. They are also excellent dispersants for slime and are used for this purpose in both tabling and flotation of slimy ores. In tabling operations they disperse the slime and prevent occlusion of ore particles. The dispersing action on slimes has accounted for improved filtration in lead-zinc operations and resulted in a reduced moisture content in the concentrate. The dispersing properties of lignosulfonates are made use of in the fluidized transportation of ores from mines to mills in pipelines, making possible relatively long hauls without plugging.

Uses based on chemical properties

The sulfonic acid groups of lignosulfonic acids react with proteins to form insoluble complexes. Use is made of this reaction in removing contaminating proteins from effluents of canneries or fish-processing plants, and for the production of casein-lignosulfonate binders for hardboards and softboards.

The specific reaction of lignosulfonates with hide proteins make them very useful as supplements to costly vegetable tanning materials such as quebracho. Pretanning with lignosulfonates conditions the hide for rapid

*Abridged from a paper presented at the national meeting of the Forest Products Research Society.

and nearly complete absorption of vegetable tans. Although tannage with lignosulfonates alone produces inferior leathers, complementary action of lignosulfonates and vegetable or chrome tans produces leathers with qualities equal to or superior to those of regular leather grades.

Lignosulfonates have been found to be very effective for the sequestering of metallic ions. Complexing of lignosulfonates with certain metal ions adequately prevents unwanted chemical reactions, precipitations, discolorations, etc. Ferric iron, cupric copper and stannous tin are strongly sequestered by lignosulfonates. Cobalt, manganese, nickel, silver, stannic tin, uranium and zinc are moderately sequestered. The sequestering action of lignosulfonates is made use of in agriculture by sequestering undesirable trace elements in the soil to permit normal plant growth. Another agricultural application based on this action is the use of lignosulfonate-iron complex as a spray directly to the foliage to control lime-caused iron chlorosis in fruit trees. The lignosulfonate complexes appear to cause less burning of leaves and fruit than do other iron chelates currently used for the same purpose.

Lignosulfonic acids and ammonium lignosulfonates react with phenol-formaldehyde resins to give low-cost condensation products having properties similar to those of the higher-cost phenoplasts. These have found use as aggregate binders, binders for hardboard made by the dry proceess and thermo-setting binders for laminating. Another lignin-derived resin from spent sulfite liquor is now being manufactured and suggested for use as filters, as a surface for adsorption of gases or dissolved particles, as a catalyst support and as reinforcements for resins and rubber.

Partially desulfonated sodium lignosulfonates have found use as organic agents for the internal treatment of boiler waters over a wide range of temperatures and pressure. They prevent scale formation in boiler tubes, injectors, feed lines and economizers by holding in suspension the carbonate and phosphate sludges formed in the reaction between water hardness and treating chemicals.

Chemicals from lignosulfonates

Commercial manufacture of vanillin from lignosulfonate was begun in 1937 by Salvo Chemical Corp. in a plant erected in Rothschild, Wis., at the mill of Marathon Corp.

While Salvo Chemical used purified lignosulfonate as a raw material, an entirely different process developed by Hibbert and Tomlinson was placed in operation at about the same time by Howard Smith Chemicals Ltd. at the sulfite pulp mill in Cornwall, Ont. In this process the whole spent sulfite liquor was treated with a large excess of caustic soda, the alkaline solution then acidified with carbon dioxide from stack gases and extracted with benzene to yield vanillin.

After the second World War two other vanillin processes were placed in commercial operation on this continent. Ontario Paper at Thorold began the production of vanillin from fermented spent sulfite liquor by a relatively low-cost process employing lime as the active alkali in the presence of oxygen. In this country Monsanto Chemical Co. has erected a plant at Seattle, Wash., utilizing concentrated ethanol-fermented spent sulfite liquor from the Puget Sound Pulp & Timber mill in Bellingham. The Monsanto process involves the conversion of lignosulfonate to vanillin by a modified sodium hydroxide-oxygen treatment.

With the availability of vanillin in quantities beyond world requirements for this substance as a flavoring agent, interest was focused on vanillin derivatives that might have many useful applications. At the Institute of Paper Chemistry processes were found for the simple conversion of vanillin to vanillic acid, which heretofore had been a laboratory curiosity. This in turn gave rise to new esters and derivatives of vanillic acid. Ethyl vanillate for example was found to be less toxic to humans than sodium benzoate but very toxic to specific micro-organisms. As such it found uses as a preservative in foodstuffs and in the treatment of human diseases.

Vanillin since has been converted into hundreds of related compounds, and many of these have been evaluated for a variety of end uses. Some of these will soon be in commercial production. Among other chemicals that have been prepared from vanillin are guaiacol, acetovanillone, syringaldehyde, syringic acid, 5-carboxyvanillin, 5-carboxyvanillic acid, vanillil and a number of other guaiacyl and syringyl compounds.

A recent development from the laboratories of Rayonier Inc. of Shelton, Wash., has been the preparation of polyesters from hydroxyalkyl ethers of vanillic acid. The polyester is obtained through the condensation of the hydroxyethyl ether of vanillic acid or its methyl ester by means of heat and catalyst. The linear polyester can be extruded in the form of fibers or filaments, can be molded in a press or cast from a melt. The process has been placed in pilot plant production by Japan's Kokoku Rayon & Pulp Co. on Kyushu. This plant produces a polyester fiber that is more elastic than wool, less elastic than nylon, heavier and harder than nylon and lighter than cotton. Another similar product has recently been reported from protocatechuic acid, which is also prepared from lignin vanillin.

Uses of alkali lignins

Alkali lignins isolated by acidification of kraft black liquors have found industrial uses very similar to those of the lignosulfonates. Alkali lignins differ from lignosulfonates in that they are soluble only in alkaline solutions above a pH of approximately 9.

Alkali lignins have found several important uses in the rubber industry. When used as a dispersant for carbon black it provides additional reinforcing to the carbon and rubber. Alkali lignin is being used commercially as an extender and modifier for latex compounds in making adhesives, impregnants, latex-dipped goods, etc. It has been found that lignin can be added to latex in large percentages without causing coagulation of the rubber solids. It is compatible with natural, GR-S, nitrile, and Neoprene latices.

Alkali lignins combine with proteins, enzymes and other nitrogen-containing substances. The products are in general soluble in neutral and alkaline solutions but are precipitable with acids. This property of lignin is made use of commercially in the defecation of sugar juices and in the removal of proteins from processs waters so that they may be discarded into natural waterways. Alkali lignin in a dissolved state is a cheap sequestering agent for calcium and magnesium over a narrow pH range. In systems containing fatty and rosin acids the lignin preferentially reacts with the metal ions, thus preventing the formation of insoluble soaps. Sodium and potassium soap emulsions are thus stabilized against the harmful action of hard water or other calcium-bearing materials.

Alkali lignin has a relatively high phenolic group content and reacts with formaldehyde and other aldehydes to form resins.

Alkali lignin is unique as a compounding ingredient for vinyl plastics. It can be used to increase the tear resistance of unsupported vinyl films, giving the film a rich brown color and a satiny texture.

The insolubility of alkali lignins in acidic solutions has been overcome recently by West Virginia Pulp & Paper Co. at Charleston, S. C., through a process of sulfonation that yields lignosulfonic acids.

Demopolis Mill

(Continued from page 23)

In connection with the recovery system, a complete recausticizing system has been installed. An innovation of this system, as installed in this mill, is the two-stage slaking system (the primary tank taking surges and kiln output and the secondary tank slaking and classifying). Of special interest also is the unit compartment design of the green liquor clarifier, white liquor clarifier and lime mud washer. A complete list of the recausticizing equipment is shown in the list of principal equipment.

Lime mud is burned in a 9-ft. diameter, 250-ft. long kiln equipped with a dust collector and srubber. The kiln is designed to burn either gas or fuel oil. Kiln operation is controlled through a centralized manual control panel near the firing end. An automatic kiln draft control holds kiln pressure constant by continuously adjusting the induced fan damper.

Steam and power generation

In addition to the recovery furnace generating 169,000 lb. steam/hr. there is a power boiler supplying 200,000 lb. steam/hr. and designed to burn bark and gas, oil or coal. The combustion control system is designed accordingly. The boiler is equipped with a chain grate spreader for coal, a jet spreader for bark burning, a superheater, an air heater, flues, ducts and cyclone steam separators.

Furnace draft in the power boiler is regulated by controlling induced draft. Feed water is controlled by a three-element feed water control system. Feed water is supplied to both boilers from a deaerating feed water heater by two 30-40-gpm pumps, one driven by a motor and the other by a turbine.

Bark is handled between the barking drums and the bark-burning boiler by a conveying system as follows: A 30-in. wide belt-conveyor carries bark from the barking drum hoppers to the dewatering conveyor. The conveyor has a capacity of 11 tons/hr. of wet bark. A double-trough flight conveyor is designed to handle bark from the conveyor underneath the barking drum, while the perforated trough section handles wet bark from the settling basin. A 30-in. belt conveyor then carries the bark from the flight conveyor to the screen at the rate of 22 tons/hr. The bark screen is a CA 1512 vibrating screen equipped with a blank plate for the first 3 ft. followed by 9 ft. of screening length with 4-in. square perforations. Screen tailings are ground in No. 12 CB hogs. A 24-in. wide belt conveyor then carries the screened or hogged bark from the screen tower to the belt conveyor over the boiler house.

Conveyor scales are used to control the feed of bark and coal to the bark-burning furnaces. These scales incorporate a pneumatic force-balance system that continuously generates a force exactly equal to the weight of material passing over the belt by permitting air to enter or leave a cell equipped with a constant diaphragm. The air pressure acting upon this diaphragm is an exact indication of the force necessary to support the material on the belt.

Electric power is generated in a 9375-kw turbine generator operating under 575-psi steam and exhausting into the process steam supply system at 160 psi. The turbine generator is equipped with a direct-connected exciter, air cooler and condenser.

The 75,000-sq. ft., two-pass, radial flow condenser is designed to receive a maximum of 70,000 lb./hr. of steam from the turbine generator at the exhaust pressure of 3-in. Hg. The condenser uses 7700 gpm of 90°F cooling water. Two two-stage 180-gpm horizontal centrifugal pumps return the condensate to the power boiler. Air and non-condensible gases are removed from the condenser by a twin-element two-stage steam jet air ejector.

Water supply

To meet the water requirements of the new mill, some 20,000,000 gal./day of water are pumped by four vertical 5000-gpm pumps from the Tombigbee River. The water is passed first through a 4½-ft. wide traveling screen followed by a 30-in. self-cleaning strainer. It then goes to the complete boiler feedwater water treatment system, which consists of two 88-ft. diamter reactivators (cold process softeners and clarifiers), eight gravity sand filters and a complete demineralizing system.

The reactivators, designed to handle a total flow of 13,900 gpm both for coagulation and softening, consist of steel equipment supported in prestressed concrete tanks. The water flows from the reactivators to four double-bay filters treating the total flow. It then flows to a concrete clear well that is common to all filters. The filters are equipped with selected anthrafilt filtering material, wash troughs and all necessary controls.

The water is then treated in a multi-bed demineralizing system consisting of three cation and three anion units. These units have a total average flow of 320 gpm and have the dimensions of 60-in. diameter × 6 ft. and 72-in. diameter × 8 ft. respectively.

High-capacity styrene resin is used in the cation units and strongly basic anion resin in the anion units. The tanks are completely rubber-lined using an anthrafilt underdrain system. Complete regeneration equipment consisting of acid and caustic regeneration units and complete instrumentation complete the system for the semi-automatic regeneration cycle.

Filtered water is stored in basins and pumped to the mill by three vertical pumps of 6000-gpm capacity each.

Pipe and Fittings

(Continued from page 29)

per mills. The first is where the solution handled requires the corrosion resistance of the stainless steel. The second is where the solution handled is non-corrosive but must not become contaminated.

One example of the use of stainless steel to combat contamination of product is from the final washer in a pulp mill bleach plant to the paper machine. After bleaching the pulp (often to a very high brightness) it must be kept free of any contamination by dirt, rust, mill scale, etc.

The use of stainless steel piping materials in pulp and paper mills has increased tremendously in recent years. Its use has drastically cut maintenance costs in some cases, where elsewhere it has allowed processes to be used that practically could not have been used without it. It has become so popular that in some cases it has been used where a less expensive material would have sufficed. In other places it has been used for services where it was not suited and failed in an alarmingly short time. In still other places it has been cut, welded and otherwise fabricated by improper methods that caused failure (generally at the welds) where actually it was the proper material for the conditions and would have given excellent service if it had been properly fabricated.

Stainless steel is a very versatile material for use in pulp and paper mills, but it is not a cure-all and must be handled properly and used for services where it is needed and where it will give good service.

Wrought iron pipe and fittings

Wrought iron is a ferrous material with glass-like fibers of minute size uniformly distributed throughout its mass. Wrought iron pipe is manufactured in accordance with ASA B36.10, ASA B36.2 and ASTM A72. Wrought iron fittings are man-

(Continued on page 52)

CHIPS BURN...

BUT PAPER REMAINS STRONG AND CLEAN . . . THANKS TO CENTRI-CLEANERS

The fire in the chip bin was relatively small. Production men were worried . . . should they try to use the fire-charred chips? Would their cleaning equipment take out the carbon? It was a risk, but they charged a digester. The resulting pulp going over the bleach plant washer looked bad.

At the Centri-Cleaners, things looked much brighter. All of the bits of charred wood were being removed and the pulp was left clean. Not a pound of pulp was lost, and the resulting paper was the usual clean, high quality product.

This incident occurred in the sulphite mill of a large eastern paper company. It parallels many other stories attesting to the effectiveness of Bauer Centri-Cleaners. Do you have a cleanliness problem? Wire, write or call FAirfax 3-5501.

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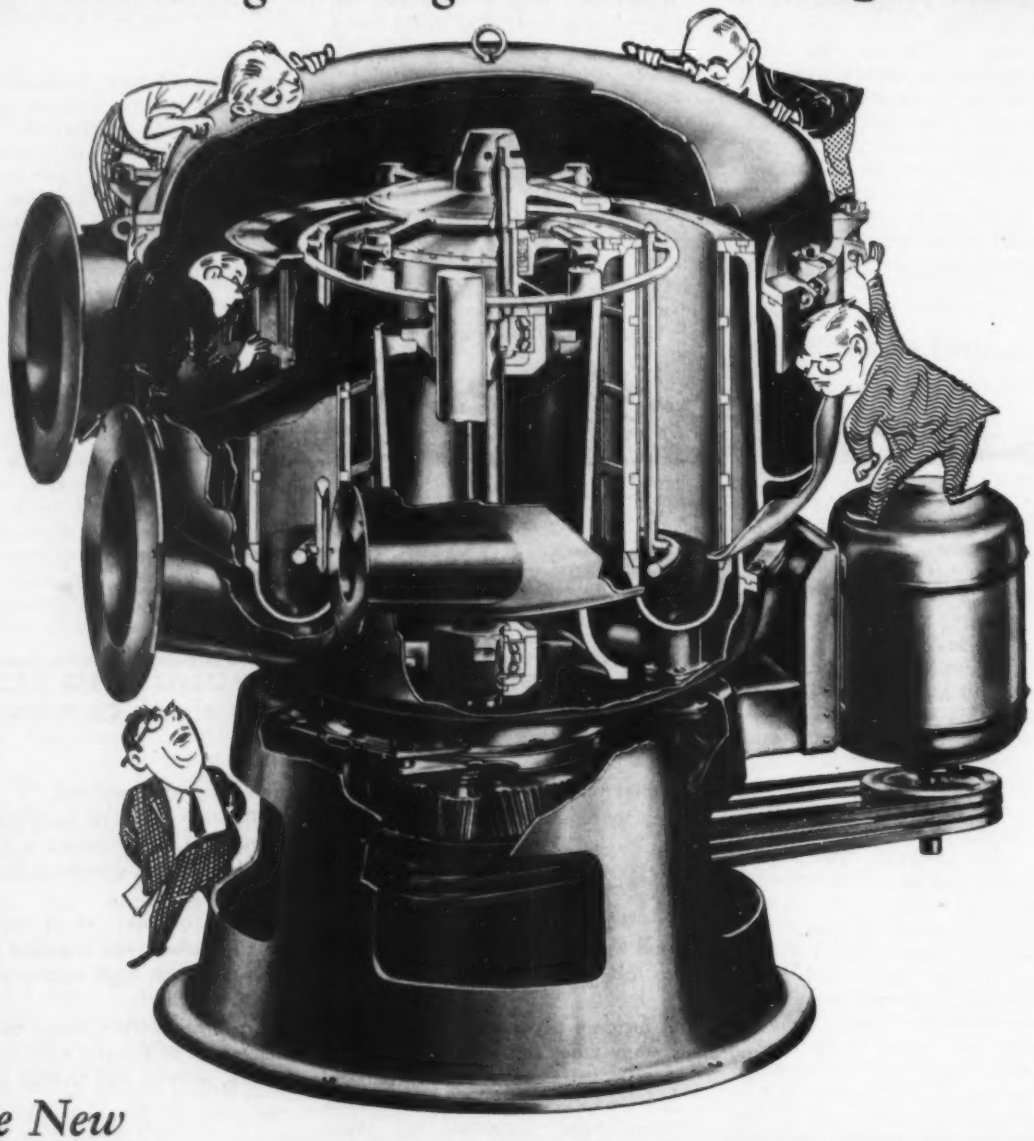

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CURRENT COMMENTS

Canada: the long pull . . . export-mindedness . . . and full circle

by WARREN B. BULLOCK

Canada is looking to the long pull for the prosperous development of its newsprint field, despite the discouraging results of 1957 operations. A survey of corporate income reports for 1957 indicates that the newsprint mills, because of the too rapid capacity expansion, felt the drop in consumer buying to a sharper degree than was evident in other grades, though the printing paper market was not too satisfactory.

Canada, however, in surveying the future sees an increase in exports to the United States by 1975 of 50 per cent over the tonnage exported to this market in 1957, while also foreseeing an increase of 400 per cent in its newsprint shipments to the rest of the world. It would take a much smaller tonnage increase in shipments, however, to produce the 400-per cent tonnage increase to the world outside the United States than to get a 50-per cent increase in shipments to the United States.

Some salient figures for 1957 tell of the recession in the newsprint market. Kimberly-Clark, which has operating supervision and stock ownership partnership in Coosa River in the South and Spruce Falls in Canada, reports a drop in its returns due to dividend cuts by these companies. Great Northern was hit by water shortage, which forced higher costs in steam power production.

Trouble in plywood

International, one of the greatest of the newsprint manufacturers, has not as yet shown any downward trend sufficient to seriously affect its prospects. However, in its newly acquired plywood field International has decided to reduce production 25 per cent until the price picture improves. International is in the plywood field through its acquiring Long-Bell Lumber, one of the largest producers.

Canada's forward look in the newsprint area is not blinded by the rapid development of the newsprint industry in the southern United States, perhaps because the kraft process that made that production growth possible can also be applied to the aspen and similar forest growth so prevalent in the north, where formerly only the spruce was considered available.

Foreign investment up

The developing export-mindedness in the United States paper industry is being accompanied by investment in foreign lands by domestic companies. Champion Paper & Fibre has announced its interest in a projected integrated bleached pulp mill in Brazil. Champion will be responsible for the management and operation of the mill, which will have an initial capacity of 150 tons per day, chiefly from eucalyptus wood. Pulp for the Brazilian market is expected to be available next year.

Kimberly-Clark, already with interests in Mexican and Canadian companies, has announced that its West German affiliate has begun converting Kleenex tissues for the German market. Cellulose wadding, originally designed by the Germans in World War I for hospital bandages, has been brought to full fruition by American industry.

The American Paper & Pulp Association has gone on record before the House of Representatives Ways and Means Committee in favor of the extension of the Reciprocal Trade Agreement Act, stating that, "This industry approves of the tariff reduction authority requested by the Administration but opposes the alternative proposing decreases in tariffs by three percentage points ad valorem". The presentation qualified its approval of the Administrative proposal by stating that the exercise of authority under the act should take full account of two principles, mandatory reciprocity and limitation of negotiation to the principal foreign supplier.

Agreement between Mead and the outstanding merchandising firm of Bermingham & Prosser of Chicago brings together two companies with many years of close association.

Allied Paper has acquired a fourth company in the converting field, the latest being the Sharon Div. of Osborne Paper.

Financial Reports

Paper mill securities did not join in the general advance experienced by other Wall Street securities as March opened with promise of a gradual return to a more favorable level. Paper mill stocks were almost universally lower than during the early weeks or February.

Stock and Bond Quotations

New York Stock Exchange — Stocks

Closing Prices	March 10, 1958	Feb. 10, 1958
American Can (Marathon)	42⅜	42⅜
Celotex	28⅛	31
Same Pref.	177⅛	181⅛
Certain-Teed	9¼	9⅛
Champion P. & F.	37⅞	36½
Same Pref.	96	*98½-100
Chesapeake	26½	27½
Container	18¼	18¾
Same Pref.	*95-98	*91-93
Continental Can	45	43⅞
Crown Zellerbach	45⅛	47¼
Same Pref.	97	98¾
Diamond-Gardner	28⅜	28½
Eastern	20¼	*18¾-19¼
Federal Paper Board	34⅛	41¾
Same Pref.	20⅛	*20-20¼
Fibre Paperboard	26⅜	24¾
Same Pref.	*93-95	84¼
Great Northern	41⅝	47½
Hammermill	23	24¼
International	88½	91¾
Same Pref.	*91½-95	94½
Kimberly-Clark	51¾	50
MacAndrews & Forbes	26¾	28½
Masonite	29½	28⅜
Mead	35	26¾
Same Pref.	*92-94	*92-94½
Minnesota & Ontario	24¼	24⅛
Oxford	29½	29
Same Pref.	91½	*90-92
Rayonier	16¼	16⅜
Riegel	23⅛	23
St. Regis	30¼	30¾
Same Pref.	*93¼-94½	*91½-93
Scott Paper	63½	58
Same $3.40 Pref.	80	82½
Same $4 Pref.	*95½-97½	*96-98½
Sealright	26⅞	*26-26½
Sutherland	33⅛	32⅛
Union Bag-Camp	31	32¾
United B. & C.	21¾	*20⅛-20⅞
United Wallpaper	6⅜	7⅛-7½
Same Pref.	*13½-15½	*14-15½
U. S. Gypsum	70¼	73½
Same Pref.	164	169
West Va. P. & P.	34⅛	34⅛
Same Pref.	*96¾-94	99

New York Stock Exchange — Bonds

A. P. W. 5%	75	—
Champion P & F. 3¾%	95¼	—
Champion P. & F. 3%	93	93
Mead 3%	—	—
Scott 3%	99½	99

American Stock Exchange — Stocks

Allied	7⅞	8¼
American Writing	18½	20
Brown	10⅛	10
Puget Sound	14½	14½

*Closing Bid and Asked Prices

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Blowers and exhausters for diversified industrial applications.

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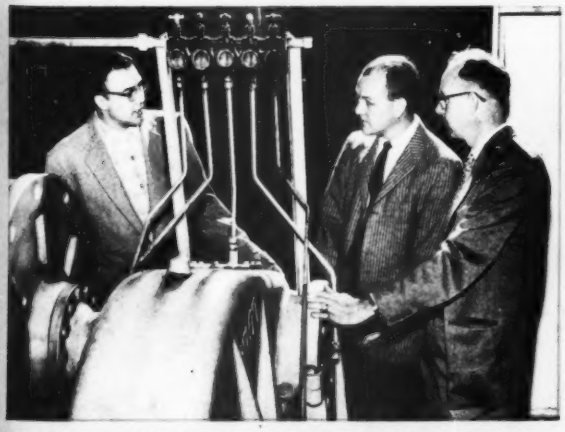
The Beloit Album

CROWN ZELLERBACH Corporation's new 264" Coated Book Machine, St. Francisville, Louisiana, is discussed at Beloit by *(l to r)* J. H. Solbakken, central engineering, Seattle; E. D. Beachler, vice president, engineering, Beloit; E. S. Skinner, chief engineer, Beloit; J. E. Goodwillie, vice president, Beloit; and E. H. Nunn, resident manager at St. Francisville.

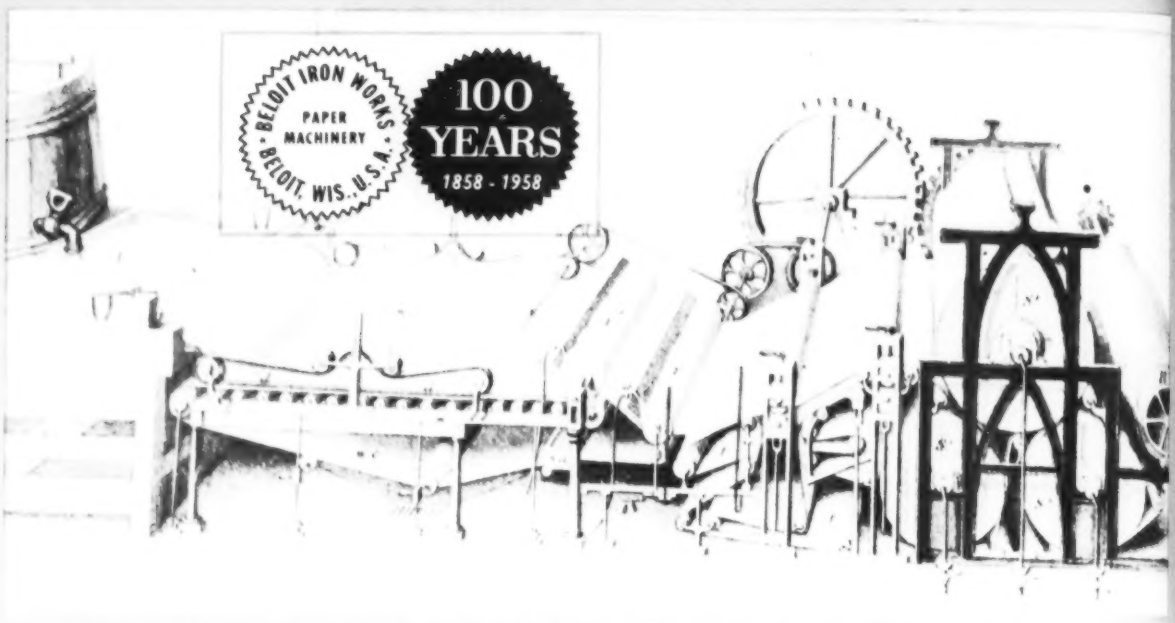
CANADIANS get together at Beloit as G. L. Carruthers, president *(c)*, and J. E. Carruthers, vice president *(r)*, Interlake Tissue Mills, discuss a machine rebuild with C. E. Meili, assistant vice president, Beloit International (Canada) Ltd.

ENSO GUTZEIT'S Pentti Rautalahti *(c, l)* and Kai Halsas *(c, r)* discuss a drive, similar to one of the units being installed on their new Summa machine, with R. B. Hebb *(r)*, superintendent of erecting, and A. G. Olson, Beloit sales.



WEST VIRGINIA PULP AND PAPER Company's new No. 3 machine at Charleston, S. C., is discussed by Westvaco's project engineer G. P. Ramsay *(c)*, assistant mill manager C. A. Shoudy *(r)*, and C. E. Shimeall, Beloit sales.

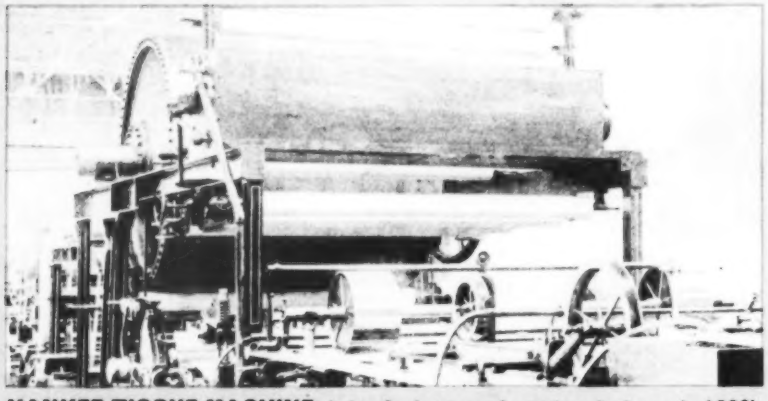
STONEBRIDGE PAPER Corporation's president A. G. Leonard Jr. *(l)* and paper mill supt. W. Smith *(r)* review inspection report on finish grinding of their new 12' Yankee with Beloit inspector John Kerwin *(c, r)* and R. R. Olson, chief, service department.



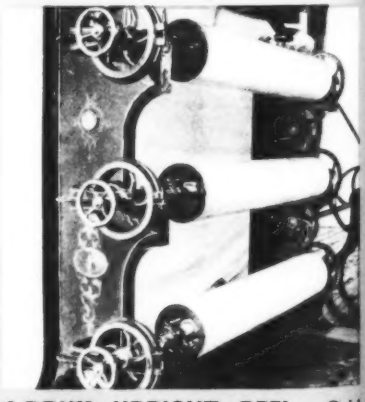
PAPER MACHINE, circa 1850. They just don't build 'em like they used to! And a good thing, too, wouldn't you say?

A BACKWARD GLANCE AT HISTORY... MAKES YOU APPRECIATE PROGRESS

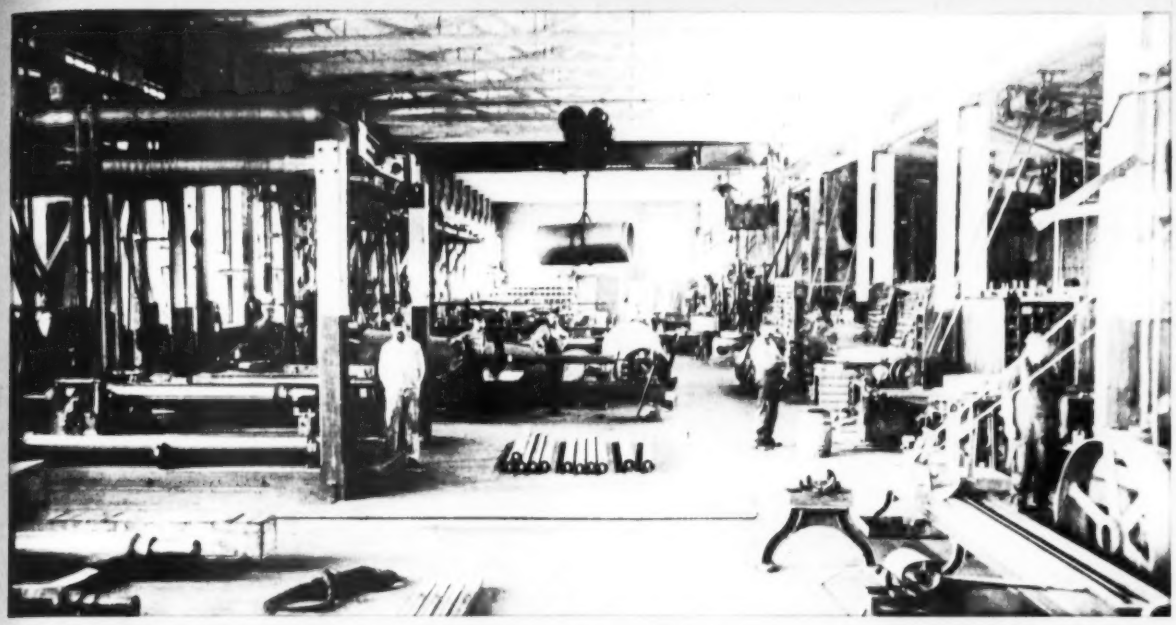
Papermakers, glancing at the venerable items shown on these pages, will perhaps smile. If their memories go back far enough they may even remember working with some of these forerunners of today's high-speed high-production equipment. Views like these remind one that progress in the paper industry has been steady and gratifying. Paper machinery today is miles ahead of anything "Grandpa" could command—greater operating efficiency, more speed, better quality of paper, greater technology behind it. . . . These old pictures, long buried in our files, seem appropriate to Beloit's Centennial year. It is somewhat surprising to realize that Beloit's beginning (in 1858) was only 60 years after Nicholas Louis Robert had applied for patents on his crude experimental papermaking machine in France. But while a nostalgic backward look is excusable, and sometimes even stimulating, we never forget that the *forward look* is an obligation. There are busy years ahead, new machines to build, new records to establish. So, with this bow to the past we greet the future—pleased and privileged to be inaugurating our second century as "your partner in papermaking."



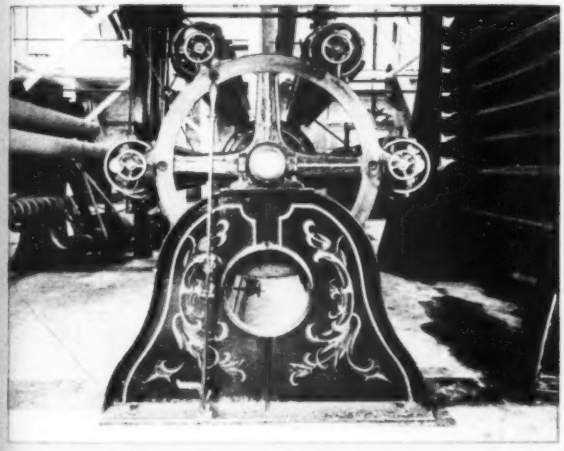
YANKEE TISSUE MACHINE during final stages of erection. In the early 1900's this type of machine was known as a "Flying Dutchman"—speedy for its day and age.



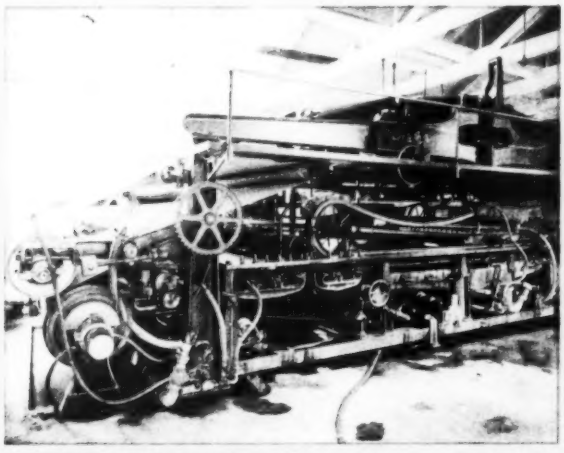
3-DRUM UPRIGHT REEL. Gold edging and decoration was once a "must."



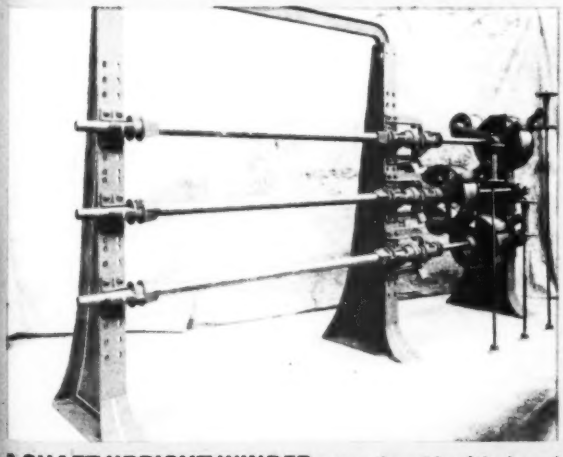
TURN-OF-THE-CENTURY view of North Machine Shop, Beloit Iron Works. You can't miss the general idea, but some things look strange—such as the overhead shafts, pulleys, and belts used for driving machine tools. Today, this area houses our Planer Department.



6-DRUM REVOLVING REEL—a forward step in speed. Lever *(c, I)* moved spools into reeling and unwinding position.



HARPER FOURDRINIER. No open couch draw here! Unusual Fourdrinier design was for production of fragile sheet.



3-SHAFT UPRIGHT WINDER—once the pride of the board field. Screw device adjusted tension on "flat belt" drive.

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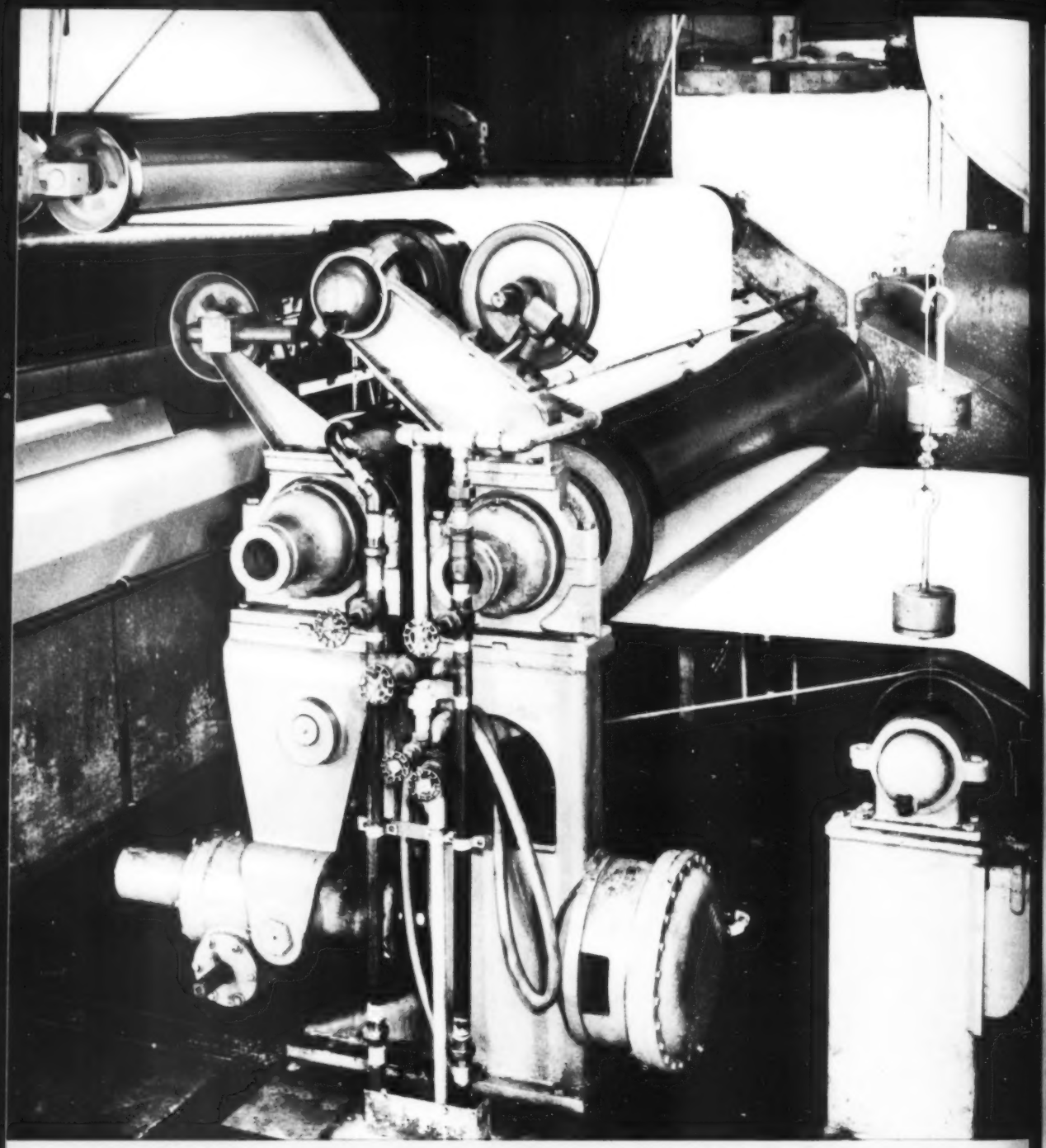
PAPER MACHINERY

100 YEARS

WHEN YOU BUY BELOIT
. . . YOU BUY MORE THAN A MACHINE



NEKOOSA-EDWARDS PAPER CO. PHOTO BY J. W. MILLER

BELOIT HORIZONTAL SIZE PRESS. Unexcelled for uniform treatment of both sides of the sheet simultaneously. This versatile press can be used for light coatings as well as for more conventional size and starch applications. No full-width pan is required. Excess solution is collected in simple edge pans at front and back sides. This compact new press is an ideal low-cost addition to existing paper machines where extended grade flexibility is desired.

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WHEN YOU BUY BELOIT . . . YOU BUY MORE THAN A MACHINE

BELOIT

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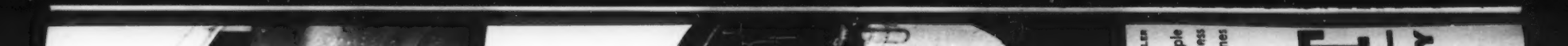

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NEWS of the INDUSTRY

Champion Paper & Fibre Proposes $30,000,000 West Coast Mill

Shasta Pulp & Paper Co. may produce bleached pulp and paper on the West Coast if a study of economic factors proves the proposal feasible.

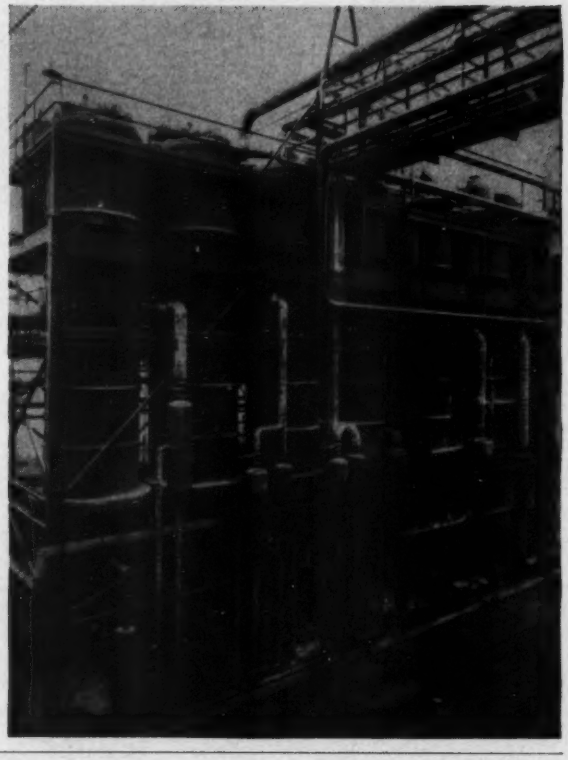
Shasta would be the firm organized by Champion Paper & Fibre Co. of Hamilton, Ohio, in conjunction with one or more as yet undetermined partners. The site under consideration for the $30,000,000 plant is near Fairfield in Solano County, 60 mi. northeast of San Francisco.

According to Herbert T. Randall, Champion's vice president for research and engineering, the study will show whether all factors—marketing and manufacturing costs, shipping costs, pollution control, etc.—"can be put together and made to work into a profitable enterprise".

Detailing the plans as evolved early in March, Randall declared, "it is very difficult to build a bleached pulp and paper mill having less than 300 tons per day capacity. When you get smaller than this there is very little chance for a net profit on the operation. The bigger the mill, the better chance for profits. . .".

IMMENSE Buflovak septuple-effect evaporator concentrates waste black liquor at the Longview Fibre Co. mill in Longview, Wash. Condensing the liquor from a 16-per cent solids content to one of 55 per cent, the unit has a daily capacity to treat the liquor from the plant's 400-ton pulp production.

Manufactured by the Buflovak Equipment Div. of Blaw-Knox Co., the evaporator features the use of three vapor heat exchangers that reduce steam usage by an hourly 5500 lb. Total heating surface is 66,500 sq. ft. Over-all performance is 6.3 lb. water evaporated per pound of steam.



Control of Doeskin Products Bought by Canadian Group

Doeskin Products Inc. has undergone its second major top-level change in three months. A Canadian group headed by three Montreal businessmen recently acquired control of the firm from the Cuban interests that took over its operation in November.

The Canadian group—headed by Samuel J. Smiley, Leo O. L'Esperance and Louis Schneider—reportedly put in 8 per cent of the purchase price in cash and will pay the remainder in installments over the next five years. They will then own 1,000,000 of the 1,070,000 shares of stock outstanding. (On the day prior to the transaction Doeskin stock was quoted at 1⅝ bid, 2 ask on the over-the-counter market.)

Smiley becomes board chairman, while L'Esperance and Schneider have been named directors. Continuing as president is Leon Henderson, who was in charge of OPA during World War II.

Brown Co. Spokesman Sees Improved Conditions

Berlin, N. H. operations of Brown Co. were at about 80 per cent of capacity at the middle of March, up from 65-75 per cent in December and January.

A. E. Harold Fair, president of the firm, has predicted an improvement in business during 1958 that will necessitate a resumption of the presently-curtailed woods operations.

Fair added that, "We do not think the present situation should be any cause for gloomy prophecies, and the fact that directors of Brown have invested in new machinery and improved facilities in recent years should indicate the confidence of the company in the future".

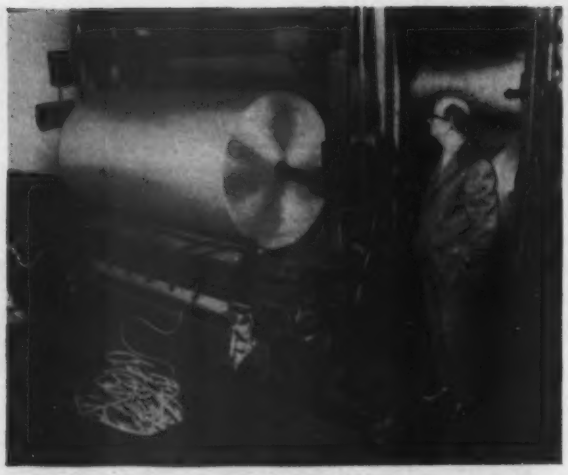
Correction

On page 1029 of the March issue it was stated that, "For the first time in history the United States will plant 1 billion forest trees during 1958". This forestry milestone was passed in 1957 — not 1958 as stated.

Plenty of Facilities

The paper industry will have plenty of extra facilities to satisfy all demand that may develop over the next several years, according to John H. Hinman.

The president of International Paper Co. declared that paper and board mill capacity rose 6 per cent during 1957, while at the same



THE RESULT of Moore & White's 41-day rehabilitation job at the Sweets Laboratories mill in Manayunk, Pa.: a 50-in. roll of corrugating medium takes shape at the dry end of the 1895 vintage 81-in. fourdrinier.

1895 Machine Rebuilt in Six-Week Rehabilitation

A 63-year old fourdrinier is producing 50-in. rolls of corrugating at the Manayunk (Philadelphia), Pa. mill of Sweets Laboratories, Inc. Not so many weeks ago the mill stood idle, time and neglect having left their marks on the 1895 paper machine.

Purchased recently by Sweets Laboratories from Pencoyd Paper Co., the plant was put into full operation within six weeks. It is now furnishing paper stock for the huge Bala-Cynwyd plant of Connelly Containers, manufacturer of corrugated containers, sheets and weatherproofing. (Sweets Laboratories is a wholly owned subsidiary of Connelly.)

Moore & White Inc., Philadelphia manufacturer of papermaking machinery, undertook the rehabilitation.

M&W's Second Unit

Inspecting the facilities of the idle mill prior to tackling the job of renovation, Moore & White's president, Joseph McTommoney, determined that the 81-in. trim fourdrinier had been constructed some 63 years before by M&W and was the second ever produced by the firm.

McTommoney estimated that the rebuilding would require from eight to ten weeks. Officials of Sweets Laboratories had a slightly different plan: The remainder of the mill could be put in working order in six weeks, *and that would be precisely the length of time allowed M&W for its share of the work.*

Moore & White technicians went to work. Every day of down-time meant a substantial loss to Connelly Containers. Crews worked around the clock. The machine was torn down completely; all dryer bearing housings and liners were renewed; machine drives were rebuilt at the M&W plant; the shake was cleaned and overhauled; rehabilitation and improvement was complete.

Moore & White had tackled the job and had brought it to culmination just one day short of the six-week deadline. The initial run was a success, requiring but minor adjustments.

The mill is now turning out rolls of 50-in. corrugating medium in basis weights of from 20 to 34 lb.

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time total output by North American mills declined slightly.

Mead Closes Nashville Plant

Operations at the Nashville, Tenn. paperboard mill of Mead Corp. have been discontinued "due to the economic conditions in the paperboard industry".

International, Harbor Plywood Settle Suit

International Paper Co. and Harbor Plywod Corp. of Portland, Ore., have reported that an agreement has been reached providing for final settlement of all litigation pending between the firms.

The settlement disposes of the suit instituted nearly two years ago by Harbor Plywood against the former Long-Bell Lumber Co., which firm was merged into International in 1956. The latter company will pay Harbor Plywood $2,000,000 in connection with the settlement.

In addition, the two companies announced that International is purchasing from the Portland firm long-term cutting rights on 27,000 acres of land on the Lewis River owned by the Northern Pacific Railway in the State of Washington, together with 700 acres owned directly by Harbor Plywood.

Recent Expansions in the Industry

American Can Co.'s
Dixie Cup Div. will open a $3,000,000 plant at Lexington, Ky., sometime this year. The firm, stepping up the development of new products and markets, will also expand facilities at Darlington, S. C.; Fort Smith, Ark.; Anaheim, Cal., and Brampton, Ont.

Canadian International Paper Co.
will spend $1,000,000 on a construction and improvement program at its sulfite pulp mill at Temiskaming, Que. According to H. Anvik, mill manager, the project will involve the installation of new equipment and the improvement of existing facilities.

International Paper Co.
has announced the formation of a Wood Preserving Div. "in order to provide more complete utilization of all its forest resources". The new division, which will operate five wood-preserving plants in the South and Northwest, is to be under the direction of C. V. Holbrook, who was vice president of Long-Bell Lumber Co. prior to that firm's merger with International.

Martin Paper Products Ltd.,
jointly owned subsidiary of Powell River Co. Ltd. and MacMillan & Bloedel Ltd., plans to construct an $800,000 plant in Regina, Sask., for the manufacture of corrugated containers.

Cornell Paperboard Products Co.
has acquired a 120,000-sq. ft. plant in Cicero, Ill., for the manufacture of folding cartons. Two existing Chicago operations will be consolidated at the new site.

Olin Mathieson Chemical Corp.'s
Brazilian subsidiary, Olinkraft S. A., Cellulosa e Papel, has obtained a $1,200,000 loan from International Finance Corp. for the purchase of a kraft pulp and paper mill, a hydroelectric power plant and pine timberlands. Olin Mathieson is making

Forestry...1958

For modern forestry, saws and axes are not enough. Up-to-date equipment, like helicopters and two-way radios, are essential. They help the scientific forester control fire and pests, locate and survey timber, and reseed cut-over areas.

With equipment like this, Weyerhaeuser foresters are constantly improving the productivity of the company's forestlands. By modern forestry practices, and through good forest management, Weyerhaeuser tree farms can produce a continuous flow of wood, assuring a dependable supply of wood pulp and other forest products.

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POIRIER
Counterflow

CONSISTENCY AND BASIS WEIGHT REGULATOR

Poirier's Counterflow Regulator is guaranteed to prevent basis weight variation regardless of incoming consistency.

To you, this means more uniform finished paper, quicker, easier and more economical.

HERE'S WHY: —

* Basis Weight controlled to within 2% (+—); consistency 1/10 of 1%.
* Volume regulated even when stock is too light to be controlled by consistency.
* No moving parts.
* Outgoing consistency may be controlled to as low as .5%.
* Operates on all tonnages and grades.
* May be applied from knotters to paper machine.
* Position available for attachment of part of Poirier Machine Variation Control.

Let our engineers study your operation and furnish you with complete details on how a Poirier Counterflow Regulator will help you as it has others. No cost — no obligation.

Write for full information

POIRIER CONTROL COMPANY
Waterville 9, Maine

Specialists in Stock Control Equipment

available $2,200,000 of the needed amount, while $1,000,000 is being borrowed from Brazilian interests.

A Pilot Plant

in northern Wisconsin for the manufacture of newsprint from low-grade hardwoods has been proposed by Senator Proxmire (Dem., Wis.). The bill introduced by the legislator provides for a loan of up to $5,000,000 to a qualified concern for the construction or the acquisition of a mill for pilot study. Research in connection with the project would be undertaken by the U. S. Forest Products Laboratory at Madison.

Mead Containers Inc.,

Dayton, Ohio wholly owned subsidiary of Mead Corp., will acquire the total assets of Ottawa River Paper Co. of Toledo. Ottawa River operates plants in Toledo and in Flint, Mich., for the production of corrugated shipping containers and corrugated specialties for the automotive, glass and food industries.

Alberta West Forest Products Corp.

is considering construction of a $25,000,000 pulp and paper mill on the outskirts of Edmonton, Alta. The plant would have an initial daily capacity of 300 tons. The company has an option on 5200 sq. mi. of timber in the White Court area, 110 mi. west of Edmonton.

Kimberly-Clark Corp.

of Neenah, Wis., is expected to give the go-ahead to expansion plans at Irving Pulp & Paper Ltd. in Lancaster, N. B. (K-C recently purchased for $8,400,000 a 35-per cent interest in the Canadian firm.) The expansion will include a 200-ton kraft pulp mill and is expected to cost about $16,000,000. (The mill now produces 200 daily tons of bleached sulfite.)

West Virginia Pulp & Paper Co.

is rebuilding No. 5 machine at the Luke, Md. mill. The unit is being dismantled to its foundation and re-erected.

Pulp-handling and shipping at . . .
Multimillion-Dollar Pulp Mill in Operation in British Columbia

MILL RAILWAY connects the pulp warehouse at the mill with the deep-sea wharf, ferry slip and scow dock. Here, the diesel locomotive owned and operated by British Columbia Forest Products enters the inside rail siding at the main storage point. One mile of trackage connects the warehouse with the wharf at a 3-per cent grade.

DESIGNED FOR EFFICIENCY and versatility, the pulp-handling, warehousing and shipping facilities at British Columbia Forest Products Ltd.'s new mill in Crofton, B. C., exemplify the latest in pulp mill materials handling.

The $38,000,000 bleached kraft mill is in operation. Daily capacity is 425 tons of pulp with brightnesses in the 88-90 range.

At the warehouse bales of bleached Crofton kraft pulp are pressed to 18- by 30- by 34-in. bales weighing 500 lb. in two 1000-ton presses. The bales are tied in Ten-

nant Development wire tying machines, conveyed to a Lamb-Grays Harbor stacker, stacked four or five high and reweighed. They are then ready for either storage or shipping.

The 160- by 280-ft. warehouse is capable of storing 8000 tons of palletized pulp. Wide-span beams and purlins, together with a single row of columns, provide adequate clear space for the maneuvering of fork lift trucks. A depressed railroad track serves the entire 280 ft. of one wall.

Protection from Damage

To protect the pulp from damage all handling—from the bale stacker, to storage and from storage to boxcar—is accomplished by Towmotor propane-fueled fork lift trucks. Five-ton capacity trucks handle palletized bale loads. A single operator can load a 50-ton boxcar in 20 min.

The warehouse and pulp mill are situated 70 ft. above sea level, whereas the CPR spur and of course the deep-sea shipping wharf are at sea level. One mile of trackage is at 3 per cent grade (the maximum) and equipped with an 80-ton 650-hp diesel locomotive.

Overland pulp shipments by rail of course pose no problem.

Pulp shipments by deep-sea vessel, however, require more handling. The normal procedure is to load palletized pulp on heavy-duty railway flat cars for the downhill run to the wharf, which 500- by 60-ft. structure boasts trackage for its entire length. (Lumber as well as pulp may be loaded; and a warehouse on the wharf itself has a capacity of up to 3000 tons of pulp.)

Fork lift trucks unload the pulp from the flat cars to storage and deliver pallets from storage to the ship's tackle. Thus in unfavorable weather the on-dock storage provides protection to the pulp being loaded; while under favorable conditions pulp may be loaded directly from the main warehouse at the mill.

Crown Zellerbach Corp. plans to ask the United States Court of Appeals to review the recent decision of the Federal Trade Commission in the St. Helens case. CZ seeks a reversal of the FTC's order that the firm divest itself of the assets acquired in 1953 from St. Helens Pulp & Paper Co. in St.

Look what happened to the corn we took off the cob

STARCHES • DEXTRINES • GUMS

For all phases of paper manufacturing and converting . . . beaters, tub sizing, coatings, calendering, corrugating and laminating.

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THE IDEAL PAPER MACHINE FELT

The FELT of proper weave and texture that properly fits the machine.

The FELT that has the toughness of fiber to take punishment and deliver maximum service.

The FELT that has pliable fibers and has the quality of fiber that will not mat and slow up the drainage prematurely.

The FELT that will resist chlorine, sulfuric and muriatic acids.

The FELT that will resist bacteria where bacteria is present.

Knowing all the conditions pertaining to any given machine, Orr field men specify Orr felts with painstaking care. Consult them on your felt problems.

Orr-Chem and Orr An-Bac treated felts and standard untreated felts.

THE ORR FELT & BLANKET CO.
PIQUA, OHIO

News of the Industry . . .

Helens, Ore. The order was based on the FTC's claim that the acquisition was a violation of the Clayton Anti-Trust Act.

American Paper Products Co., East Liverpool, Ohio envelope manufacturer, will move its operations to Boardman (near Youngstown) in April. The new $500,000 plant will employ about 150 people.

Graham Paper Co. has completed its new manufacturing and converting plant in St. Louis. The 40,000-sq. ft. structure will house the latest in manufacturing equipment and materials handling devices, the latter including pallets with electric straddle-type warehouse trucks. Production includes converted rolls for bank and office use, as well as file folders and index cards, laundry paper supplies and boxed typewriter paper.

International Paper Co.'s Single Service Div. will build a plant for the manufacturer of paper milk containers near North Miami Beach, Fla. Completion of the facility—with a monthly capacity of 35,000,000 units—is scheduled for this summer.

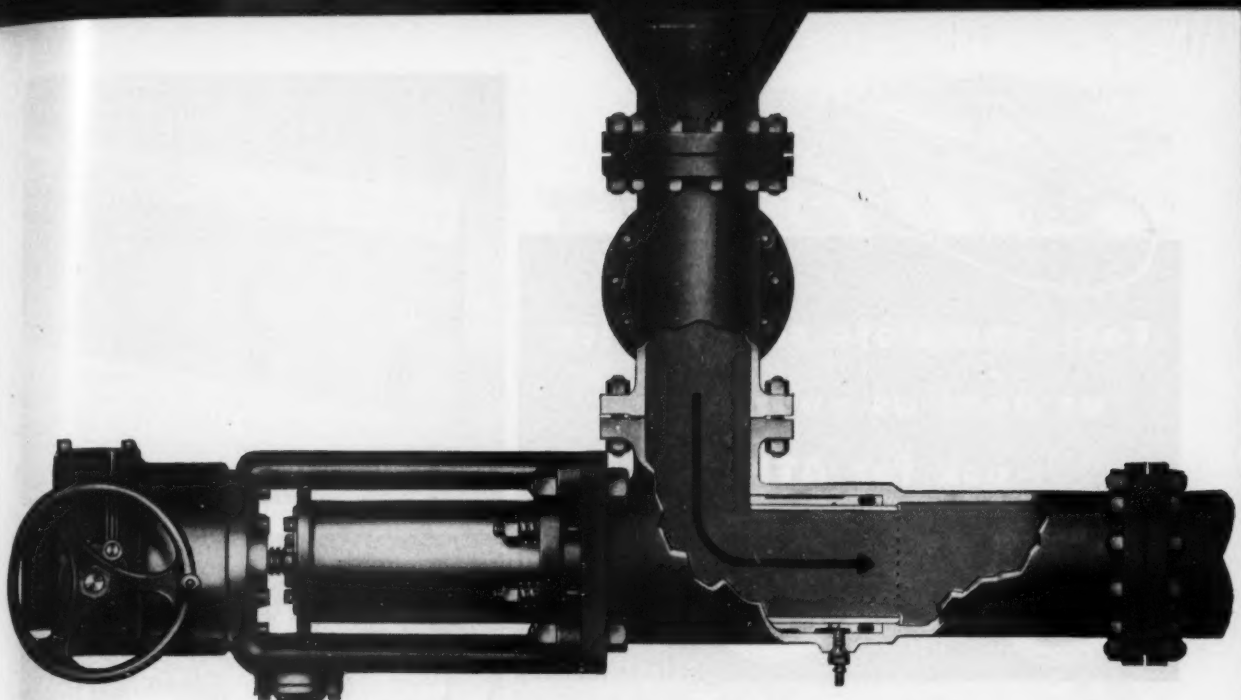
Allied News Notes . . .

Cameron Machine Co. has completed its move from Brooklyn, N.Y., to Dover, N.J. The new 93,000-sq. ft. plant is located on a 25-acre site and is designed for future expansion. In conjunction with the move, Cameron has installed new machine tools and production equipment and has set up a development and test section.

Testing Machines Inc. has moved to larger quarters in Mineola, L.I. A new department has been established for the custom designing of new instruments and for the special modification for testing instruments that are not ordinarily handled through standard methods.

Crawford Fitting Co. of Cleveland has appointed Jackson Supply Co. of Ferguson, Mo., as its exclusive stocking distributor of Swagelok tube fittings in Missouri and parts of Illinois, Arkansas and Kentucky.

Allied Chemical & Dye Corp.'s



full, free digester discharge

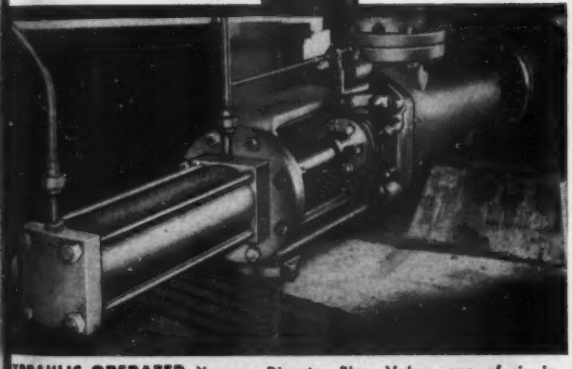
Digesters blow fast and clean with YARWAY Seatless Blow Valves.

The hollow sliding plunger has no pockets where wood chips or tramp materials can hang up.

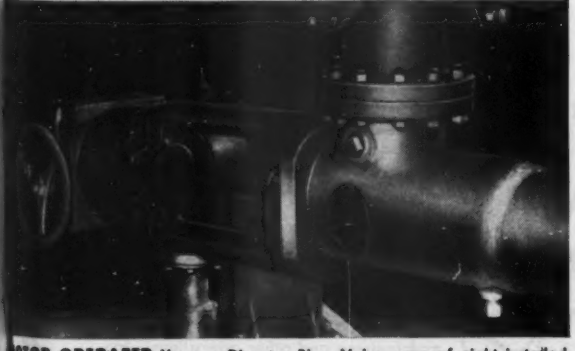
All Yarway Digester Valves have full pipe area, permitting fast discharge with minimum pressure drop. Comparisons show greater discharge area—reducing blowing time, increasing number of cooks.

Scores of pulp mills report *lower operating costs* and *increased production* due to YARWAY Digester Blow Valves. One large mill found *savings in operation and maintenance the first year more than paid the cost of their 4 new Digester Valves!*

YARWAY Seatless Digester Valves can be furnished either with electric motor or hydraulic cylinder units. Both are remote controlled. Bulletin B-441 gives the whole story. Write for it.



YDRAULIC-OPERATED Yarway Digester Blow Valve—one of six in-alled at large North Carolina paper mill.



OTOR-OPERATED Yarway Digester Blow Valve—one of eight installed large Canadian paper mill.

YARNALL-WARING COMPANY
149 Mermaid Avenue, Philadelphia 19, Pa.
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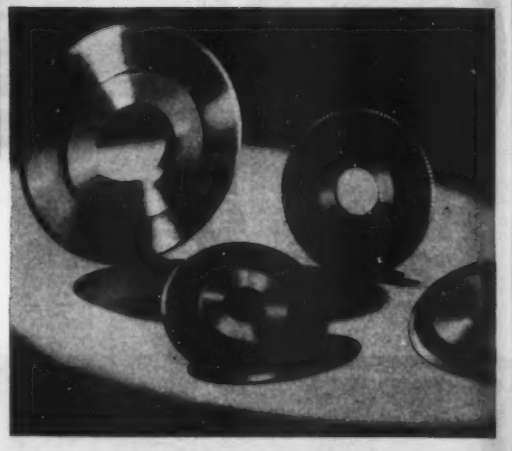

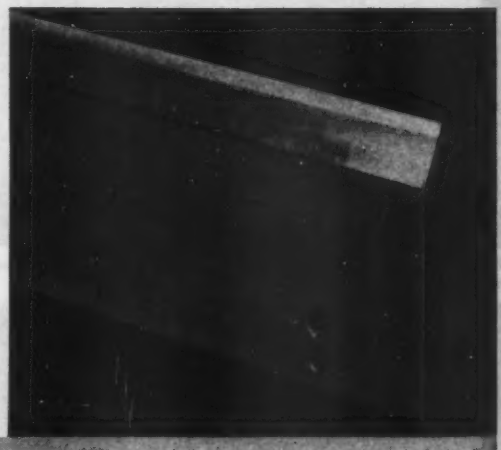

● Ask for Atkins chipper knives, circular slitters, paper knives. Depend on *Silver Steel* for chipping, slitting, trimming—and for cutting costs.

Your nearby Atkins distributor can give you fast, exacting, dependable service—often special emergency service—to keep your production lines up, to keep your labor costs down. He can supply *Silver Steel* equipment to meet your every requirement and specification. He can provide help and advice in making your cutting operations less costly and more efficient. He's backed by Atkins engineering, Atkins research,, Atkins craftsmanship—to give you one complete line for every paper-cutting need.

Call your Atkins distributor now. Let him make the *Silver Steel* recommendations that save time and money on every cut. Standardize on Atkins—your one dependable source for all standard paper-cutting tools.

Sharpie* says: **"Always Sell ATKINS —a *Cut Above* the Rest!"**

ATKINS Silver Steel SAWS

ATKINS SAW DIVISION

BORG-WARNER CORPORATION

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Branches: Chicago, Philadelphia, Chattanooga, Los Angeles, Portland, Oregon

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America's Quality Line of Cutting Equipment Since 1857

Chipper knives, circular slitters, paper knives, saws, files—for production, maintenance and other operations—for papers, woods, metals and plastics.

*"Sharpie" is a Trade Mark of Borg-Warner Corp.

Solvay Process Div. has announced the completion of a new dense soda ash plant at Baton Rouge, La. The latest expansion doubles the previous capacity.

Monsanto Chemical Co. has purchased the physical assets of **Filtered Rosin Products Inc.** of Baxley, Ga., manufacturer of paper size and other gum rosin products. The firm will continue to operate as the separate and newly formed Filtered Rosin Products Co.

Illinois Gear & Machine Co. has reported the completion of its plant expansion program at the South Works in Chicago. The principal feature of the project is the 300- by 80-ft. heavy machinery building.

Walworth Co. has moved its executive offices to new and larger quarters at 750 Third Ave., New York 17, N. Y.

The paper merchandising department of **Bulkley Dunton & Co. Inc.** has been transferred to its wholly owned subsidiary, **Carter Rice Storrs & Bement Inc.** The new operating name is Bulkley Dunton & Co. Div. of Carter Rice Storrs & Bement Inc.

National Starch Products Inc. has occupied new and larger quarters at 750 Third Ave., New York, N. Y.

Coming Events

Tappi

May 14-16—Ninth Coating Conference, Bedford Springs Hotel, Bedford, Pa.

May 15—Kalamazoo Valley Section (joint meeting with Michigan Superintendents), Hotel Harris, Kalamazoo, Mich.

May 15-17—Pacific Coast Section (joint meeting with Pacific Coast Superintendents and Pacific Coast CPPA), Empress Hotel, Victoria, B. C.

July 7-18—Seventh Statistics Course, Laval University, Quebec, P. Q.

Superintendents Association

May 2—Connecticut Valley Division, Publick House, Sturbridge, Mass.

May 15-17—Pacific Coast Division (joint meeting with Pacific Coast Tappi and Pacific Coast CPPA), Empress Hotel, Victoria, B. C.

June 3-5—National Meeting, Statler Hotel, Boston

Other meetings

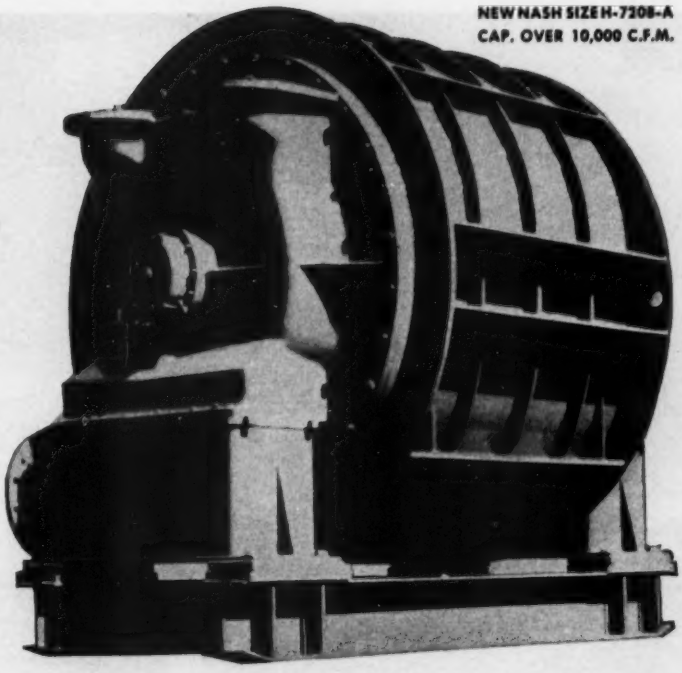
April 21-23—Fibre Box Association (annual spring meeting), Edgewater Beach Hotel, Chicago

April 24—First Cellulose Conference, Cellulose Research Institute, State University College of Forestry, Syracuse, N. Y.

May 5—American Society of Training Directors, Pulp & Paper Section, Sheraton-Park Hotel, Washington

May 19-23—National Safety Council, Safety Management Techniques Training Course, Chicago

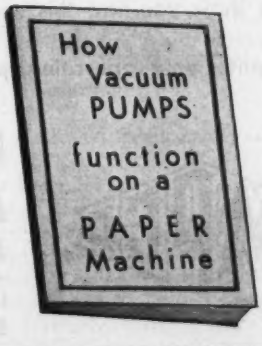
June 2-4—Canadian Pulp & Paper Association, Technical Section summer meeting, Chateau Frontenac, Quebec, P. Q.



If three days lost production on a paper machine amounts to more than the cost of Vacuum Pumps, dependability is the prime factor in pump selection.

Over a thousand leading mills depend on Nash Vacuum Pumps to insure continuous production. Nash Pumps are built sturdy enough to stand the pounding of continuous production. They are simple. They have no internal parts in wearing contact. They will handle slugs of water or stock. They are designed to operate at the low speeds necessary for long life and reliability. Don't gamble with your production. Install Nash Vacuum Pumps and be safe.

NASH ENGINEERING COMPANY
SOUTH NORWALK, CONN. U.S.A.



Of equal interest to Management and to Machine Operators is this informative booklet just published. A copy will be mailed to you free upon request.

Name_____

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Photo courtesy of St. Regis Paper Co., Jacksonville, Florida. 11'-6" x 20' Valveless Decker Saveall operating with new "Seminole Chief" Kraft Board Machine.

IMPCO VALVELESS DECKER-SAVEALLS

There are more than 235 Impco Valveless installations. Many of these fall in the Decker-Saveall category. Several handle the entire paper machine production, using white water as dilution. Some act as broke thickeners, again using white water as dilution. Others are in a variety of saveall applications. In all cases the Impco Valveless delivers clarified effluent suitable for re-use, with pulp discharged at a controllable consistency for proper stock preparation. May we show you how this versatile machine can reduce your costs and simplify your operating procedure?

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In Canada, Sherbrooke Machineries Limited, Sherbrooke, Quebec

NAMES *in the* NEWS

Paul K. Honey

G. A. Tougas

P. K. Honey Promoted

Paul K. Honey, vice president of Buckeye Cellulose Corp., has been promoted to the newly created position of manager of the Cellulose & Specialties Div. He is being succeeded as manager of Florida operations by G. A. Tougas, formerly manager of the Foley, Fla. mill.

Previously responsible for all Buckeye's Florida activities and the cotton linter pulp manufacturing facilities in Memphis, Tenn., Honey will now direct all pulp operations, including research, manufacturing and sales. He has been associated with the Procter & Gamble organization 26 years.

Succeeding Tougas as Foley mill manager is O. L. Wakeman, construction manager for the current mill expansion project.

J. D. Zink

J. H. DeVitt

Hammermill Appoints Two

The appointments of John D. Zink as senior vice president and of John H. DeVitt as assistant general manager have been announced by Hammermill Paper Co. at Erie, Pa.

In addition to the senior vice presidency, Zink will continue as director of merchandising and as a director and member of the executive committee. DeVitt likewise will continue as treasurer and as a member of the board of directors.

Former president of Old Colony Envelope and Strathmore Paper companies, Zink joined Hammermill in 1946 as administrative assistant in the sales department. He is a former vice president of the American Paper & Pulp Association and a former member of the association's board of governors.

John H. DeVitt joined Hammermill in 1922 and was named to the accounting department in 1926. He became assistant auditor in 1932, director of the budget in 1942, controller and head of the accounting department in 1944, assistant treasurer in 1948 and treasurer in 1953. He is a member of the Statistical and Controllers committees of the APPA.

George L. Gouker has been named general superintendent of the pulp mill of Alaska Lumber & Pulp Co. Inc. being constructed at Sitka. He was formerly assistant superintendent for Rayonier Inc. at Fernandina Beach, Fla.

Allied Personalities . .

Ralph Leighton, technical service manager for Stowe-Woodward Inc., has retired after 27 years with the firm. He remains with the company on a part-time basis as a consultant.

Kent W. Smith has been elected vice president of Improved Machinery Inc. Treasurer of the firm and a director since 1949, he joined the company in 1942 as office manager. Succeeding Smith as treasurer is **Allan M. Barker,** while **Gilbert Bucknam** becomes comptroller and assistant treasurer.

J. A. Kolb has been made sales engineer in the New York district office of the Industrial Silencer Div. of Burgess-Manning Co. For the past three years he has been field sales engineer in Chicago. At the same time **Louis G. Halla** was named to succeed Kolb in Chicago. He was formerly with Wallace & Tiernan Inc.

Patton Mfg. Co. of Springfield, Ohio, has reported two personnel changes: **Wayne T. Crannell,** sales manager of the paper mill division, becomes divisional general manager; **Charles E. Hill,** chief engineer, becomes field sales engineer.

Appleton Machine Co. has named **D. E. Lamon** chief engineer. He was formerly assistant chief engineer. At the same time **H. K. Abramson,** assistant to the manager of sales engineering, became sales office manager.

William H. Mordo, Neenah, Wis. divisional manager for Stowe-Woodward Inc. since 1954, has returned to the home office of the firm in Newton Upper Falls, Mass., as technical service manager.

Bruce Mayo, a sales engineer at Louisville, Ky., since 1955, has been named district manager of the Atlanta office of Link-Belt Co. He succeeds **J. Ross Arnold,** who will handle special assignments at the Link-Belt plant at Colmar, Pa.

Allan Hyer has retired from active service as vice president of Black-Clawson Co. He joined the firm in 1918 and has been one of its leading pulp and paper mill representatives in both the United States and Canada. Most recently he has served as a special representative for all Black-Clawson divisions.

Robert L. Schuerman has been promoted from assistant manager of industrial sales to manager of the newly organized sales department serving the paper and related industries for A. E. Staley Mfg. Co. Since 1955 he has been in charge of sales to the paper and corrugating industries.

Necrology . . .

Albert A. Scharwachter

Albert A. Scharwachter, 61, executive vice president of Arizona Chemical Co., was killed recently in an acci-

dent at Winter Park, Fla. His home was in Garden City, N. Y.

Scharwachter, who had been president of the Pulp Chemicals Association since 1955, began his career in the chemical industry in 1911 when he joined A. Klipstein & Co. of New York, N. Y. He subsequently transferred to American Cyanamid Co. when the two firms merged. In 1952 he was named sales manager of Arizona Chemical, a firm owned by Cyanamid and International Paper.

He was elected vice president in 1953 and executive vice president in 1956.

Charles K. Blandin

Charles K. Blandin, president of Blandin Paper Co. in Grand Rapids, Minn., died recently at the age of 85. He had been associated with the firm as principal owner and chief executive officer since the early 1920s.

Blandin was born in Iola, Wis., in 1872. At the age of 18 he founded a weekly newspaper at Sanborn, Minn., later establishing the *Olivia Press* in Olivia. Shortly after the turn of the century Blandin became a subscription solicitor for the *Minneapolis Tribune*. In 1904 he was named circulation manager of the *St. Paul Pioneer Press* and held the same post when the *Dispatch* and *Pioneer Press* were consolidated in 1909. He subsequently became business manager and was publisher and principal owner when the papers were sold in 1927.

At the time the newspapers were sold Blandin retained control of the old Itasca Paper Co. mill in Grand Rapids, which the publishing firm had purchased in 1916. Through the years he modernized and expanded the paper plant, gradually dropping the production of newsprint in favor of "slick" papers for magazines.

Joseph B. White

Joseph B. White, 87, president of Pequannock Valley Paper Co. of Butler, N. J., died in March.

White had served as president of the firm for about two decades and had previously been associated with the sales department. (Pequannock Valley Paper has been in the control of the White family many years.)

Carroll L. Wilson

Carroll L. Wilson, 57, director of finance for Champion Paper & Fibre Co. since 1947, died recently at Hamilton, Ohio.

A graduate mechanical engineer from Harvard University, Wilson served as a venture consultant to Champion Paper & Fibre beginning in 1944. His concern was the development of financial and economic

(Continued on page 68)

Pipe and Fittings

(Continued from page 32)

ufactured in accordance with ASA B16.9 and ASTM A72 (pipe), ASTM A42 (plate) and ASTM A73 (forgings).

Although not used extensively in pulp and paper mill piping systems, wrought iron possesses corrosion resistance characteristics that warrant its consideration. It has been found to give satisfactory service in water systems, condensate systems, brine service, concentrated sulfuric acid service, caustic systems and others. It has a good degree of corrosion resistance to many soil conditions, and this results in satisfactory service for piping that must be buried underground.

Wrought iron pipe is appreciably more expensive than carbon steel piping but is a material worth considering for those services where carbon steel is not satisfactory.

Cast iron pipe and fittings

Cast iron pipe and fittings are used extensively in pulp and paper mills. It is used both above and below ground for a variety of services.

Cast iron pipe and fittings are manufactured in a wide variety of types, sizes and weights. The variety obtainable is almost bewildering.

The following are manufactured in accordance with ASTM A377:

ASA A21.2—Cast Iron Pit Cast Pipe for Water or Other Liquids
ASA A21.3—Cast Iron Pit Cast Pipe for Gas
ASA A21.6—Cast Iron Pipe Centrifugally Cast in Metal Molds for Water or Other Liquids
ASA A21.7—Cast Iron Pipe Centrifugally Cast in Metal Molds for Gas
ASA A21.8—Cast Iron Pipe Centrifugally Cast in Sand-Lined Molds for Water or Other Liquids
ASA A21.9—Cast Iron Pipe Centrifugally Cast in Sand-Lined Molds
ASA A21.10—Short Body Cast Iron Fittings, 3 to 12 in., for 250-psi Water Pressure, plus Water Hammer
ASA A21.11—A Mechanical Joint for Cast Iron Pressure Pipe and Fittings
ASA B16.1—Cast Iron Pipe Flanges and Flanged Fittings, Class 125
ASA B16b—Cast Iron Pipe Flanges and Flanged Fittings, Class 250

Cast Iron Soil Pipe is manufactured in accordance with ASTM A74 and ASA A40.4.

The following are manufactured in accordance with ASTM A126:

ASA B16.1—Cast Iron Pipe Flanges and Flanged Fittings, Class 125
ASA B16b—Cast Iron Pipe Flanges and Flanged Fittings, Class 250
ASA B16b1—Cast Iron Pipe Flanges and Flanged Fittings, Class 800
ASA B16b2—Cast Iron Pipe Flanges and Flanged Fittings, Class 25
ASA B16.4—Cast Iron Screwed Fittings, 125 and 250 lb.
ASA B16.12—Cast Iron Screwed Drainage Fittings
ASA B16.14—Ferrous Plugs, Bushings Locknuts
ASA B16.16—Cast Iron Flanges and Flanged Fittings for Refrigerant Piping

There is a variety of types of end joints available for cast iron pipe and fittings. The ones most used are bell-and-spigot, mechanical joint and flanged. Of course, a tremendous number of cast iron screwed fittings are used with carbon steel, wrought iron and other types of pipe.

The bell-and-spigot and mechanical joint styles are generally used for underground service. The bell-and-spigot joint is calked with a suitable calking material for the service (yarn, jute, braided cotton, rubber, a special paper, etc.) and a joint material such as lead, sulfur compound or cement. The mechanical joint uses a rubber gasket compressed by a gland. It results in a superior joint over the bell-and-spigot type and allows work to progress even in a wet trench. The mechanical joint pipe and fittings cost a little more than the bell-and-spigot type, but a savings in labor cost is effected by its use that compensates for the increased material cost.

Cast iron flanged fittings are used extensively with carbon steel pipe in the various process services. Very little cast iron flanged pipe is used today in process areas except in the above-ground portion of the water treatment system and in process and sanitary waste systems.

In some cases it might be well to add a cement mortar lining to cast iron pipe and fittings. This is applied in accordance with ASA A21.4—Cement Mortar Lining for Cast Iron Pipe and Fittings.

Cement mortar linings prevent tuberculation of the inside surface of the piping and thereby maintain the same coefficient of friction over the years as the new pipe had. This reduces the power cost of pumping. Also, depending upon the characteristics of the water, cement mortar linings tend to reduce some taste, odor and color problems.

Building the skill of experience into

LODDING DOCTORS...

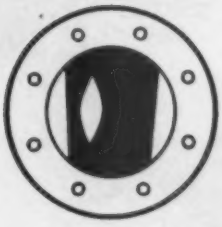
Joe Pietrzak has planed more than 3,000 doctors. It is such skill as Joe's that contributes to the service that Lodding Doctors bring to the paper industry.

The high performance which everyone expects and receives from Lodding Doctors is the result of the care and experience of the team producing them. This is an asset which only comes in specializing in doctors over the years.

During the last ten years, Lodding has made more than 10,000 doctors, 17,000 blade holders and 350,000 blades. Lodding shares this experience with you.

LODDING ENGINEERING CORPORATION
WORCESTER, MASSACHUSETTS

Going..



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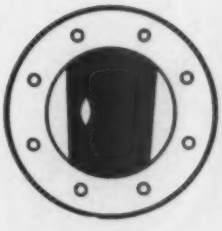

ALMOST GONE!

...yet the orifice of a DeZurik Control Valve maintains the same diamond shape throughout the control range!

DeZurik Automatic Control Valves deliver the most rigid, most accurate control you can get. No flow variations from packed stock . . . instant response and freedom from backlash . . . extreme sensitivity. Flow characteristics are easily changed by replacing a cam in the positioner.

Write for more information on DeZurik Control Valves.

DeZURIK CORPORATION
SARTELL, MINNESOTA

PATENT REVIEWS

MELVIN NORD*

Manufacture of gummed paper

U.S. 2,815,297, issued Dec. 3, 1957, to Paul W. Herrlinger, assigned to Gummed Products Co., relates to gummed paper and particularly to the breaking of the glue to improve the flatness of the sheets to facilitate press feeding and performance.

The breaking of the glue on gummed paper has been a standard practice in the industry for many years. Basically, the practice has been the same in that the function of the breaking machine was to crack the gummed surface in a diagonal manner, the gummed surface being broken first in one direction and then in the opposite direction. Breaker knives or bars were provided for this purpose, being diagonally disposed with respect to the direction of travel of the gummed web; and the gummed surface, after having passed over diagonal breakers, would run over a small rod revolving at the same surface speed as the material being treated. The rod was disposed at right angles to the direction of motion of the web. Its function was to take out whatever curl might have been caused by the breaker knives. There was no breaking whatever done by the revolving rod.

This procedure, while in general usage, has never produced a fully satisfactory sheet. It has been found that the breaking done by the first breaker knife is always much more pronounced than the breaking done by the second knife. This creates a very undesirable tendency for the sheet to curl from corner-to-corner, which is commonly referred to in the industry as a "breaker curl". The reason for the first break being more pronounced than the second is because the material comes to the first knife with the glue in a continuous film; and the first knife, acting to break the continuous film for the first time, displays a decidedly more pronounced break than does the second knife, which is simply acting to further break, or break in a different direction, a gummed surface which has already been partially broken.

In accordance with the instant invention it has been found that if the glue is broken in three directions rather than just two by employing a horizontal breaker bar acting to break the sheet transversely prior to the diagonal breaker knives, a gummed sheet is produced which does not have the tendency to curl.

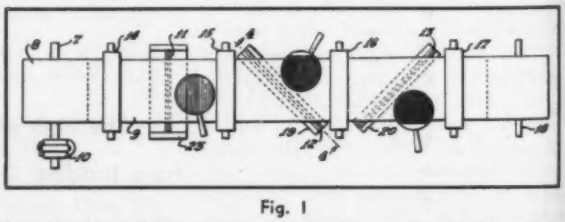

Fig. 1

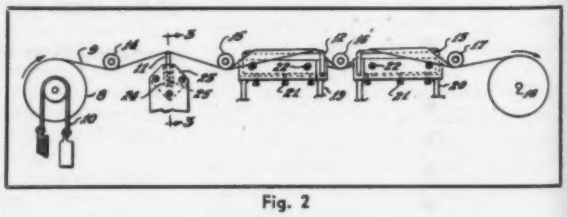

Fig. 2

In Figs. 1 and 2 the reference numeral 7 represents an unwinding roller on which is mounted a roll 8 of gummed material with the gummed surface outermost, the material being fed from the roll as a continuous web 9. The unwinding roller 7 will be provided with braking means 10 to control the unwinding speed of the web.

From the unwinding roller, the web of material is passed sequentially over the transverse breaker knife 11, a first diagonal breaker knife 12 and a second diagonal breaker knife 13, tension rollers 14, 15, 16 and 17 being positioned between the breaker

*Patent attorney, 17600 Pinehurst, Detroit 21.

knives in the manner illustrated to assure proper contact of the web with the knives. After the web has passed beyond the second breaker roll and the tension roll 17 it is rewound on a rewind roller 18 which is a driven roller serving to unwind the roll 6 and move the web over the breaker knives.

The diagonal breaker knives 12 and 13 are mounted in stands 19 and 20 respectively, the stands being provided with adjustment screws 21 and lock nuts 22 for adjusting the knives and securing them in the desired adjusted position. However, in order to create uniform horizontal breaking of the gummed surface by means of the transverse breaker knife 11 in spite of the fact that there may be a baggy section in the center of the web or should it be tight on one side and baggy on the other, the breaker knife 11 is formed from flexible steel and mounted so that it will offset the variations across the web. To this end, the knife 11 is mounted in a stand 23, the knife being vertically movable in a slot 24 and backed up by springs 25 acting to flex the knife and maintain it in contact with the sheet throughout its width. By means of this arrangement the transverse breaker knife 11 will "go and come" with baggy areas across the sheet.

Fiber stock refining apparatus

U.S. 2,811,904, issued Nov. 5, 1957, to Orange S. Herrington Jr. and assigned to Masonite Corp., relates to fiber stock refining apparatus of the jordan type.

The principal improvement is the provision of a recess in each of the impeller blades. As the plug is rotated during use, the recessed portion of each impeller blade allows a portion of the stock to escape from being immediately forced through the refiner. The turbulence thus created results in the stock being evenly distributed between all of the knives of the machine. Due to this uniform stock distribution, the brushing action of the fibers against each other is greatly enhanced, as is the shearing action of the knives.

The plug also has a greatly increased useful life.

Wet strength paper

U.S. 2,816,833, issued Dec. 17, 1957, to Leopold F. Bornstein and assigned to Synvar Corp., relates to the manufacture of wet strength paper.

The patent is based on the discovery that quebracho extract is useful in the preparation of a wet strength paper. About 1-2 per cent is added—based on the weight of the pulp. Some formaldehyde may also be added—generally 10-20 per cent of the weight of the quebracho extract.

According to the inventor, the wet strength of such paper is better than that produced with urea-formaldehyde resins.

Other Patents of Interest to the Pulp and Paper Industry

Subject	Inventor or Assignee	Patent No.	Date
Carton for panoramic automobile glass	Lloyd D. Van Antwerpen		
Packaging of dished articles	David Lantinberg	2,812,856	11/12/57
Can carrier	Waldorf Paper Products Co.	2,812,857	"
Bottle carrier	Owens-Illinois Glass Co.	2,812,878	"
Reinforced and partitioned folding box	Owens-Illinois Glass Co.	2,812,892	"
Apparatus for manufacturing pulp articles	Chaplin Corp.	2,813,463	11/19/57
Method of making paperboard boxes	International Paper Box Machine Co.	2,813,464	"
Reclosable packaging device	Federal Paper Board Co. Inc.	2,813,624	"
Non-returnable carrier	Fort Orange Paper Co.	2,813,657	"
Returnable bottle carrier	Fort Orange Paper Co.	2,813,658	"
Production of impregnated fiber mats	Wood Conversion Co.	2,813,806	"
Inserting closure parts into containers	Jagenberg-Werke A.G.	2,814,240	11/26/57
Machine for manufacturing formed paper	Societa per Azioni Fabbriche Fiammifieri ed Affini	2,814,332	"
Container body receiving cell construction for paper container-making machines	Bruno A. Wittkuhns and Gilbert F. Hill	2,814,497	"
High-alpha cellulose pulp	Rayonier Inc.	2,814,569	"
Cartons with reversible flaps	Jesse R. Grant	2,815,162	12/3/57
Shipping carton	Liftainer System Co.	2,815,163	"
Popcorn box	Claude D. Painter	2,815,164	"
Fertilizer bag	Bemis Bro. Bag Co.	2,815,165	"

For Effective Removal of

RESIDUAL CHLORINE

TC TENNESSEE CORPORATION

LIQUID SULFUR DIOXIDE

HIGHEST QUALITY

SO_2

Tennessee's Liquid Sulfur Dioxide is a most efficient and economical anti-chlor. Removes residual chlorine and other materials which cause color reversion or yellowing with age. It also eliminates excessive residual chlorine in water.

We would like to consult with you on the possibilities of Tennessee's Liquid Sulfur Dioxide in your processing.

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FOREIGN ABSTRACTS

Aqueous prehydrolysis of reeds in Romania

This is an extensive study made in Romania with *Phragmites communis* which (when air dried and freed from nodes) contained 53.39 per cent cellulose, 20.09 per cent lignin, 4.37 per cent ash and 0.46 per cent ether solubles. The reeds also contained 21.7 per cent pentosans. Changes in yield and in these components under varying conditions of aqueous hydrolysis were determined. In one series, the prehydrolysis period was maintained at 6 hrs, but the water to fiber ratio was varied as follows: 2:1, 4:1, 7:5, 1, 10:1, 15:1 and 20:1. For each of these ratios, the digestion pressure was varied between 1 and 16 atmospheres. In the second series, the water to fiber ratio was maintained at 4:1 but the hydrolysis period and the cooking pressures were varied.

In both of these series, the yields, cellulose, lignin, pentosan and ash contents of the undissolved fibrous residues were determined. The results are shown graphically and are discussed. Furfural yields in the spent aqueous liquors were also determined in the second series. In the first series, as the digestion pressures increased,

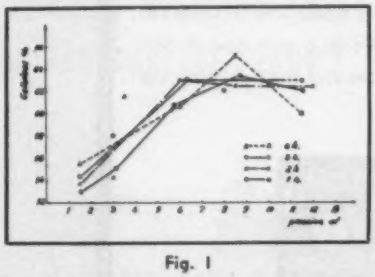


Fig. 1

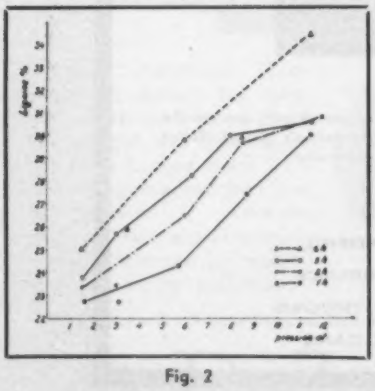


Fig. 2

the yields decreased. Up to a certain pressure, the cellulose in the residue increased and then dropped (especially in the case of the 2:1 ratio and at pressures above 9 atmospheres). The lignin content of the fibrous residues rose quite steadily up to about 34 per cent. Conversely, the pentosan content dropped greatly as the digestion pressures increased. In general, the lower the water to fiber ratio, the higher was the ash content in the residual pulp.

In the second series, yields dropped with increasing digestion time periods and with increasing pressures. The cellulose content rose and then dropped slightly, especially in the 6-hr. digestions at pressures above 9 atmospheres. The lignin rose quite rapidly both with length of digestion periods and with increase in digestion pressures. Pentosans dropped. The ash content showed no very definite trends. The general conclusions reached were that for 6-hour hydrolysis periods, with water to fiber ratios of 20:1 down to 2:1, and by keeping the pressures of hydrolysis between 5 and 9 atmospheres yields varied from 65 to 80 per cent. Fibrous residues contained between 59-68 per cent cellulose and 9 = 2.5 per cent pentosans. When a 1-hr hydrolysis period was used and the water to fiber ratio was 4:1 (at 6-8 atmospheres), the resistant residues contained 60-63 per cent cellulose and 11 to 6 per cent pentosans. In testing the spent liquors for furfural, it was shown that with a 6-hr. digestion, the highest yields were obtained at 3.5 atmospheres. For hydrolyses extending only for 1-2 hrs., the highest furfural yields were obtained at about 6 atmospheres. Figures 1 and 2 show the results (in series 2) of the effects on cellulose and lignin yields with varying time and pressures. Eleven graphs and 17 references. Cristofer Simionescu and Dorel Feldman. *Papeterie* 79, No. 9, 589, 591, 593, 595-6 (1957). (in French).

Handling newsprint broke

Although in general broke is added to a furnish largely to effect certain economies, it is claimed to give special properties to the resulting paper when added up to 15 per cent of the total furnish.

With the advent of larger and faster machines, more broke is produced, and breakers have been developed that can handle this material. These systems often have various disadvantages — often due to the additions of an excess of broke.

Recently a broke-handling plant has been installed in connection with a high-speed newsprint machine at Bowaters United Kingdom Pulp & Paper Mills Ltd. The system and its operation are described. A metered supply of broke of constant consistency is added automatically to the furnish and requires the supervision of only one operator.

A. P. Gammie. *Brit. Paper & Board Makers Assoc. Proc.*, Tech. Section 38, No. 2, 437-47, (1957); *Papermaking* 76, No. 2, 29-34 (August 1957); through B.I.P.C. 28,388 (1957).

Infection of groundwood pulp

Properties and methods for the identification of some of the more important microorganisms that cause pulp deterioration are described; and the difficulties involved in assessing strains visually are emphasized.

Fungicides are required to control unavoidable aerial pulp infection, but it was shown that phenyl mercuric acetate could be rendered inactive after a 48-hr. incubation at 25°C. by penicillium roqueforti and by drug-resistant bacteria. The failure of phenyl mercuric acetate to control this infection, and even the possible failure of a good commercially available toxicant like phenyl mercuric acetate+ oxine, requires the search for more effective fungicides (whose properties are listed). Screening procedures and the proper organization of full-scale trails are discussed.

P. Russell. *Brit. Paper & Board Makers' Assoc. Proc. Tech. Section.* 38, No. 2, 241-254 (1957); through B. I. P. Chem. 28, 499 (1957).

Relation between structure, dielectric constant and electrical resistance of fibers

Factors which affect the electrical resistance of fibers have an influence on the formation of static charges. Evidence in favor of an equation relating resistance and dielectric constant is discussed together with new evidence and the effects of molecular structure on the dielectric properties of fibers.

To eliminate static electrification, materials of low resistance are required—this depends on their having a dielectric constant of 10 or more. In native or in regenerated fibers the dielectric constant is normally high enough due to the presence of water.

The introduction of water should furnish the simplest method for gaining similar results in synthetic fibers, however this would probably introduce undesirable side effects. By introducing polar groups that would cause orientation in an electric field with a concomitant rise in dielectric constant, an undesirable absorption of water would probably result. Such an introduction would be to modify the surface layers of the fibers—thus rendering them conducting.

Five tables, 22 references and seven figures are included. J. W. S. Hearle. *J. Textile Inst., Proc.* 48, No. 1, P. 40-51 (discussion P. 51-54) (1957); through *B. I. P. Chem.* 28, No. 4, 482 (1957).

NEW PRODUCTS

These items are numbered for your convenience. Further information on the various products described may be requested at no obligation through our Readers' Service Dept. Use the business reply card in this issue.

Corrosion-controlling coatings

A series of tested chemical coatings for industry combining a wide variety of protective properties has been produced under the trade name Koropon.

Available in primers and enamels, Koropons provide outstanding resistance to alkalis, acids, solvents, humidity and vapors, according to the company. Possessing a high degree of adhesion to metal surfaces, the coatings tend to stop corrosion creepage and resist abrasion and impact stress. *United Wallpaper Inc.*

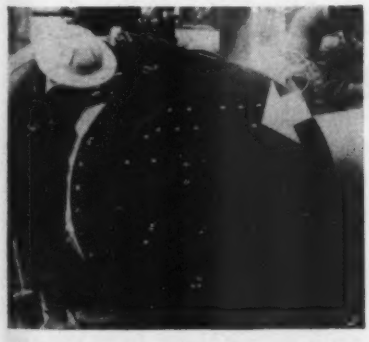
Circle No. 11 on Readers' Service Card

Cutter unit for high-speed sheeting

The R-100 Cutter-Layboy is a new unit designed for high-speed sheeting in finishing room and converting operations.

The unit has handled widths up to 84 in. and 72-in. lengths. It has been stated that stock grades from 27-lb paper to .030 cardboard have been worked efficiently. Equipped with an over-lapping delivery system, the R-100 has maintained speeds in excess of 800 fpm. *Moore & White Co.*

Circle No. 12 on Readers' Service Card



Heat exchanger and condenser tube plugs

Heat exchanger and condenser tube plugs are now being manufactured for use in sealing off corroded or leaking tubes in a heat exchanger or condenser so that the unit may continue to operate without replacing the entire tube bundle.

The plugs are made in a variety of materials for compatibility with the tubes they are used with and are available for immediate delivery in sizes for tubes of ½ to 1½ in. in diameter. *Nuclear Products Co.*

Circle No. 13 on Readers' Service Card

Light-fading tester

This is a research, testing and production control device for accelerating natural sunlight effects on all materials coated and otherwise. Among such effects are fading, photochemical changes and discolorations of papers, plastic, dyes, inks, paints, etc.

Test specimens are exposed to filtered light from the centrally-located xenon lamp. Light intensity at the sample is approximately 15,000-ft. candles. Specimens 2 × 4 in. are mounted on one or both sides of 10 specimen holders on a frame rotating uniformly about the xenon lamp. *G. F. Bush Associates.*

Circle No. 14 on Readers' Service Card

Titanium fittings and flanges

Plans to offer a complete line of welding fittings and flanges of commercially pure grades of titanium to match every schedule and size of titanium piping now made were announced by *Tube Turns Div., National Cylinder Gas Co.*

Circle No. 15 on Readers' Service Card

Paper roll clamp attachment

A new Bartel paper roll clamp attachment has been designed for Clarklift fork trucks. This clamp is designed to transport rolls up to 45 in. in diameter. The attachment is available in a single-roll model or

Quarter logs with ONE STROKE

Carthage Hydraulic Log Splitter

The Carthage Hydraulic Log Splitter quarters logs with one stroke – instead of three – and ejects the log so that the machine is always clear for incoming logs. Heavy-duty construction and interlocking safety controls assure safe, positive, trouble-free operation – proved by successful operation of these units since 1950.

Complete range of sizes for logs to 38" diameter and 9' length.

CARTHAGE MACHINE COMPANY CARTHAGE, NEW YORK

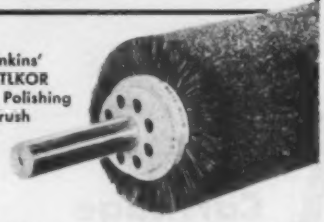
Write for Bulletin 100A.

PRIVATE EYES

Jenkins' METLKOR brushes, teamed with Viking's Void Detector, check every inch of paper as it is made, find holes, measure them, count them, record them, pinpoint their positions and signal the operator, all automatically. The Jenkins' feeler brush, a critical part of the system, sends a low voltage pulse to the Viking Indicator Unit whenever a hole appears.

John Glump, Vice-President of Viking Instruments, Inc., of East Haddam, Conn., says: "Jenkins' brushes do a superb job for us. They are an improvement on 13 counts:

1. Improve accuracy of flaw detection.
2. Have no abrasive effect on product.
3. Eliminate lint problem.
4. Outlast previous brushes 3 to 1.
5. Made exactly to size, no cutting or alterations necessary.
6. Simplified mounting.
7. Improved construction.
8. Superior bristles.
9. Refillable when bristle is worn.
10. More economical.
11. Free engineering service.
12. Speedy solution to problem.
13. Quick delivery."



Jenkins' METLKOR Paper Polishing Brush

Jenkins' also makes the following brushes for the paper industry:

Conveyor Cleaning • Blanket Washer • Fourdrinier Wire Cleaning • Polishing • Coating • Dusting • Dampening • Spray • Sieve • Static Elimination • Flocking • Felt Cleaning • Feed or Carrier • Paint Brushes • Floor Sweeps

Specify Jenkins' METLKOR the original . . . the best *Metal* Core brush

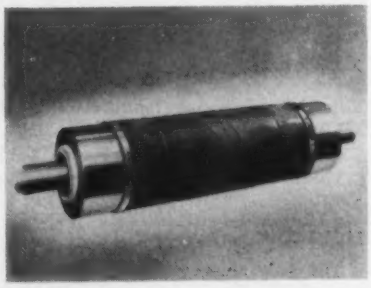
METLKOR® CYLINDER BRUSHES and LIFEWOOD® WOOD BACKED BRUSHES

M. W. JENKINS' SONS, INC.
— Serving Industry for 80 Years —
442 Pompton Ave., Cedar Grove
Essex County, N. J. • CEnter 9-5150

New Products . . .

a double-roll model and will handle weights up to 3800 lb on lighter trucks and up to 6000 lb on heavier trucks. *Clark Equipment Co.*

Circle No. 16 on Readers' Service Card



Brass-back rubber printing plate

Hug-Tite is the name given to this new printing plate which is made with a thick layer on the underside of the brass backing, which is said to provide extra cushion and prevent the plate from diaphragming or creeping.

Pre-madeready, pre-curved and pre-registered, the new plate also features notched pointers on the edges to simplify accurate alignment on the cylinder. *Moss-type Corp.*

Circle No. 17 on Readers' Service Card

Aluminum cable trough

Cable trough is now offered in expanded aluminum to supplement the expanded galvanized steel cable supports from T. J. Cope. Aluminum cable trough also offers resistance to many corrosive atmospheres.

Straight lengths are available in widths of 6, 9, 12, 18 and 24 in. and in 8-, 10- and 12-ft. lengths. *T. J. Cope Div., Rome Cable Corp.*

Circle No. 18 on Readers' Service Card

Air-operated hopper feeder

A high-suction, air-operated hopper feeder known as Vac-U-Max has been designed to offer a simple and inexpensive means for transferring fluid materials, either wet or dry, from bulk bins or shipping containers into all types of processing machinery.

Because the unit is non-electric, it may be used in hazardous locations and for materials that could not be handled safely by other methods. *Vac-U-Max Sales Co.*

Circle No. 19 on Readers' Service Card

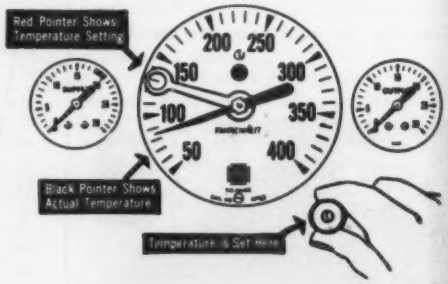
Stainless steel, renewable disc "Y" valves

A complete line of stainless steel, renewable disc "Y" valves provided with an

Automatic control for wet end dryers

The exact temperature desired on each individual wet end dryer can be set instantly and maintained automatically through a new control system offered by Stickle Steam Specialties Co.

Designed for use on the first three to eight wet end dryers, the system prevents picking, curling and cockling of paper and board by providing gradual and uniform temperature increases from one dryer to the next.



The exact temperature desired is set on a remote pilot controller (illustrated) for each individual wet end dryer being controlled. This setting is indicated on the large dial by red pointer with circle tip. A black pointer on the same dial shows actual temperature inside dryer.

In operation, the controller pneumatically actuates a diaphragm motor valve which instantly admits the correct amount of steam to raise or lower temperature inside the dryer.

A continuous visual check of the flow and actual temperature of condensate leaving the dryer is provided by a micro adjustable orifice with large 3-in. diameter sight glass and temperature dial.

According to the manufacturer, the system is the most simple, fastest acting and most accurate yet developed for control of individual wet end dryers.

It is guaranteed to meet predetermined standards. *Stickle Steam Specialties Co.*

Circle No. 20 on Readers' Service Card

Carrying on a 100 year tradition of Making Finer Felts

WHY is every operation in our mill performed so carefully, so precisely, so well?

One reason may be that a long-lived progressive company such as ours has had the time and the will to train its employees better; —to give them a sense of pride in their work. *Each* knows that he—or she— is carrying on tradition of quality handed down from mothers and fathers. Yes—even grandparents and great grandparents since 1858.

For instance, the fabric upon which this woman is working has just been removed from the loom on which it was woven in a single strip. It is being converted into the endless belt you recognize as a Hamilton Felt. The workmanship is so perfect that your eyes cannot see the joining.

If you believe, as do our employees, that a heritage of quality is important to good board and paper making write us next time you need a felt.

100 YEARS 1858-1958 QUALITY SERVICE PROGRESS SHULER & BENNINGHOFEN

YOU CAN'T BEAT

Hamilton

FELTS

SHULER & BENNINGHOFEN, HAMILTON, OHIO

New Products . . .

extra lift to remove the disc from the flow area and minimize line entrapment and pressure drop is now available.

The valves operate in the pressure range from vacuum to 275 psi at temperatures to 750°F and are available in a choice of stainless steel types. *Cooper Alloy Corp.*

Circle No. 21 on Readers' Service Card

Gear coupling

A versatile new coupling which can take up to 1800-in. lbs torque is now being produced. Designated as the 162M, the coupling offers users the advantages of no lubrication and interchangeable bushings. *John Waldron Corp.*

Circle No. 22 on Readers' Service Card

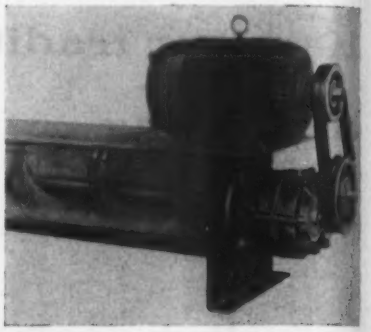
Aluminum expandable tube-sheet

Alcoa Aluminum Co. has perfected and greatly amplified a revolutionary process for producing tubular shapes within sheet and plate.

The product of the new manufacturing method has been identified as Expandable Tube-Sheet. It is a unique, one-piece unit of aluminum sheet or plate containing a series of lengthwise, parallel areas that can be expanded easily to form integral tubing.

Because liquids or gases can be circulated safely within the leak-proof enclosures, the product will be exceptionally suited to solve heating and cooling problems found in many industrial processes, especially in the heat exchanger field. *Aluminum Co. of America.*

Circle No. 23 on Readers' Service Card



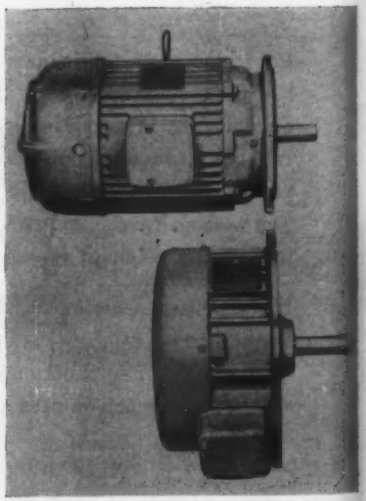
Screw conveyor drive

Here is a new screw conveyor drive which embodies a new concept in application. It consists of a speed reducer with packing gland and driving shaft mounted on the trough end.

The new design also insures the utmost protection for the speed reducer unit against invasion by the material being handled by the conveyor. Both the motor and the drive may be mounted in any position.

Four sizes are now available with each size offering two ratios — 18:1 and 8:1. *Dodge Mfg. Co.*

Circle No. 24 on Readers' Service Card



Motor

For space-cramped applications, here is a "Pancake" motor designed for use on machine tools, roof-ventilating fans and many other applications.

The motor is said to reduce motor length up to 60 per cent over standard

Two of the Men Behind Eastwood Wires

FINAL EXAM

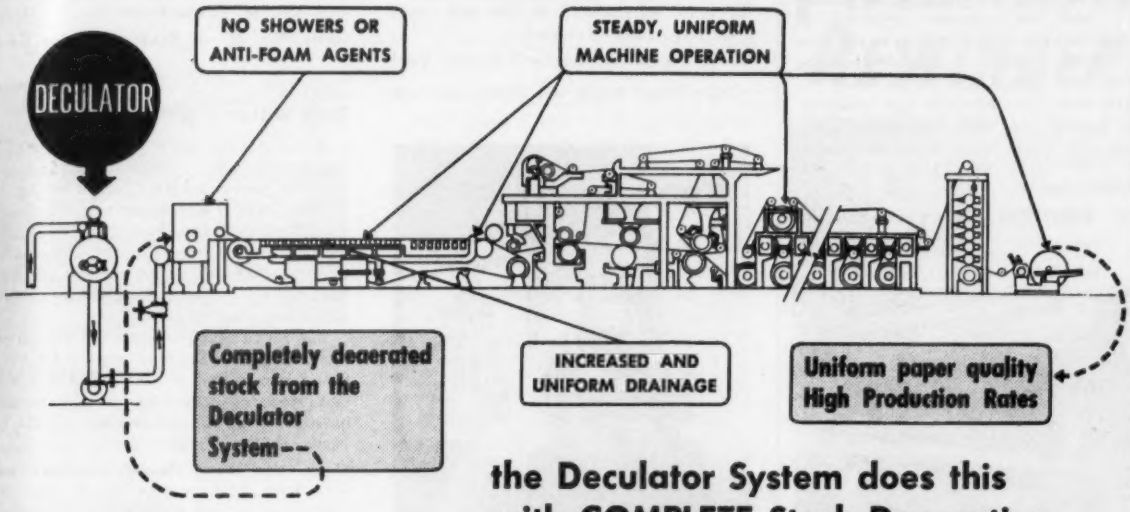
Here James Baney and Clarence Reed are making a final, inch-by-inch examination of a large fourdrinier wire. Though this is a final check, it is only one of many given it at every stage of its manufacture, from the casting of the alloys in our own foundry to the stretching table inspection shown above.

Because the Eastwood-Nealley plant is a *completely integrated* operation, every wire we ship has undergone thorough and continual analysis, control and testing from the raw metals to your finished fourdrinier wire ready for quality paper production.

We are proud to say they are *truly ours* — "from ingots to fourdrinier wire".

EASTWOOD-NEALLEY CORPORATION
Belleville, N. J.

ELIMINATION OF VARIABLES = MORE UNIFORM MACHINE OPERATION


NO SHOWERS OR ANTI-FOAM AGENTS
STEADY, UNIFORM MACHINE OPERATION
DECULATOR
Completely deaerated stock from the Deculator System--
INCREASED AND UNIFORM DRAINAGE
Uniform paper quality High Production Rates

the Deculator System does this with COMPLETE Stock Deaeration

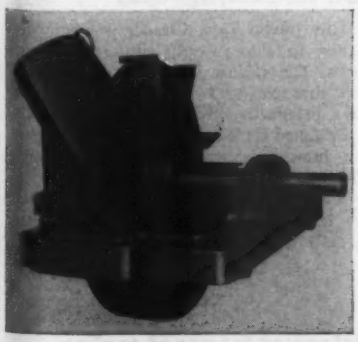
CVO

CLARK & VICARIO CORPORATION
NORTH TARRYTOWN, NEW YORK

New Products . . .

motors of the same rating. Available in ratings from 1 to 15 hp at 1800, 1200 and 900 rpm, the motor features vertical or horizontal mounting, cast iron housing-bearing bracket and factory-lubricated bearings. *Louis Allis Co.*

Circle No. 25 on Readers' Service Card



Chipper for slabs or round wood

A new chipper designed to take slabs up to 16 in. wide and pulpwood up to 7 in. diameter has been announced. Standard capacity is from 5-7 cords per hour. In the illustration the top of the blowing hood is removed showing the chip slots and blowing vanes. This unit is said to produce chips of uniform size with minimum sawdust. *Carthage Machine Co.*

Circle No. 26 on Readers' Service Card

Corrosion-resistant mill roll

Duracor "E" HT is the name given to a newly-developed, corrosion-resistant mill roll.

Made from a thermo-setting resin and bonded to a stainless steel shaft, the roll is specifically designed and engineered for processing corrosive materials in the textile and paper industries where abrasion and high operating temperatures are important factors.

Physical properties of the roll include a high tensile strength of 11,276 psi, compression strength of 27,500 psi and a temperature range up to 250°F. *Ceilcote Co. Inc.*

Circle No. 27 on Readers' Service Card

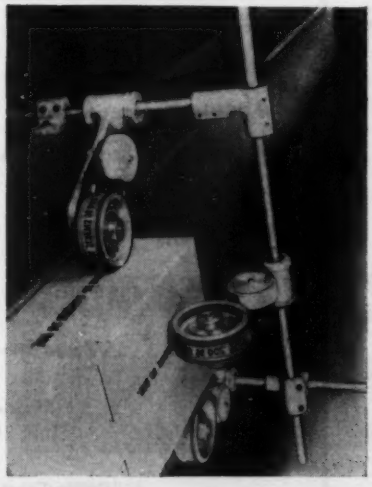
General purpose latex

Chemigum Latex 248 is a medium nitrile content butadiene acrylonitrile latex developed to meet the need for a high solids product possessing good color stability.

As a general purpose latex, it is said to contain a synthetic surfactant-type emulsification system which promotes stability during compounding and processing. It also exhibits exceptional resistance to light aging and heat deterioration.

It is now commercially available in drum or bulk quantities from *Chemical Div., Goodyear Tire & Rubber Co.*

Circle No. 28 on Readers' Service Card



Conveyor line marker

This conveyor line marker is called Versa-Matic. It has a printing roller re-

New Products . . .

volving on needle bearings and the transfer roller and ink container revolving in bronze bushings. The company states that the design results in higher marking speeds, less friction and longer life.

The basic arm assembly can accommodate 1-, 2½- or 4-in. components, interchangeable simply by replacing the original part with larger capacity parts. *Krengel Mfg. Co. Inc.*

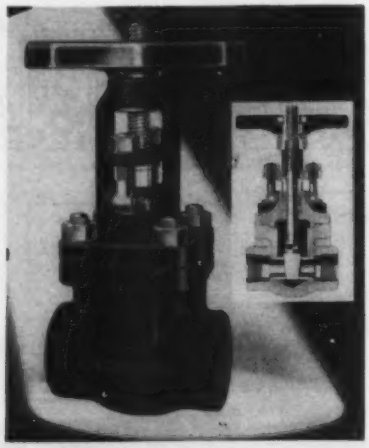
Circle No. 29 on Readers' Service Card

Gumming machine

Coatings such as animal glues, dextrines and synthetic resins can be applied by direct squeeze or reverse roll method on this new "Y"-type gummer. Present units are said to be running at speeds up to 800 fpm on various grades of gummed base stock.

The company welcomes your request for more information on this new unit. *Dilts Div., Black-Clawson Co.*

Circle No. 30 on Readers' Service Card



Forged steel valves

A new line of forged steel gate valves completely new in design and compactly built for easy installation in the most cramped quarters is being introduced by Lunkenheimer Co.

These valves are rated 800 lb at 850°F. and 2000 lb at 100°F. and are available with screwed or socket welding ends in sizes ½-2 in. *Lunkenheimer Co.*

Circle No. 31 on Readers' Service Card

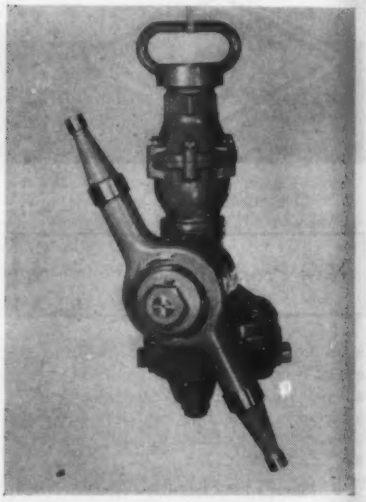
Cold water starch

A new cold water swelling cationic starch has been introduced to improve products made from tissue grades of paper.

The company has stated that this product adds substantial strength to the fiber without materially affecting absorbancy, softness or texture of premium grade dinner napkins, facial and toilet tissues and requires no cooking.

The starch is a pregelatinized version of National Starch Products' standard CATO 8 and is marketed as CATO CWS. It was developed for manufacturers who do not have facilities for pre-cooking CATO 8. *National Starch Products Inc.*

Circle No. 32 on Readers' Service Card



Unit for cleaning tanks

This Jumbo Tank Cleaner is a unit designed to automatically clean the largest tanks. The cleaner discharges up to 9400 gph through its two revolving jets that have an effective range of 50 ft. each.

Designed for marine or industrial service, the Jumbo cleaner uses available pumps and lines to drive its jets in a spherical pattern, scrubbing the entire inner surface of the largest tanks with cold or hot water up to 176° F. *Sellers Injector Corp.*

Circle No. 33 on Readers' Service Card

Defoamer for paper coating mixes

AHCO Defoamer 116 has just been introduced and is especially recommended by the company for use in paper coating mixes which contain casein, pulp colors,

Chemical Pulping Processes

The high degree of chemical, mechanical and physical control over materials and operations in the Chemipulp and Chemipulp-KC systems results in maximum plant output, high pulp quality and low operating costs.

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Pacific Coast Representative
A. H. Lundberg, Inc., P.O. Box 202, Mercer Island, Wash.

metallic stearates and latices. Small quantities are said to produce lasting effects when used to reduce, control or eliminate foam buildup in paper coating mixes. This product is available from *Arnold, Hoffman & Co. Inc.*

Circle No. 34 on Readers' Service Card

Portable elevator

This device is named Portelevator. It is a portable elevator used as a variable height loading dock and has two outstanding advantages over other methods of loading: (1) It maintains constant level with truck beds, and (2) it may be positioned and removed from position by overhead crane.

The platform is 10 × 12 ft. with a load capacity of 10 tons.

A four-page folder which illustrates and explains the device in use is offered by *Hamilton Tool Co.*

Circle No. 35 on Readers' Service Card

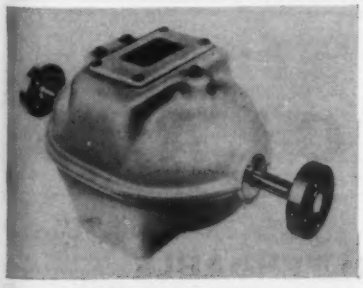
New fiber used in manufacturing high-strength paper

A new fiber specially designed for use in the manufacture of high-strength fine papers is now commercially available.

Called HXV-20, this new product for the paper industry has been successfully used in a large number of different grades. The grades of paper include onion skin, bond writing papers, ledger, weddings, index paper, blueprint and technical papers.

Complete technical information on this new fiber can be obtained from *Hercules Powder Co.*

Circle No. 36 on Readers' Service Card



Magnetic flow meter

Previously limited to a minimum line size of 1 in., this magnetic flow meter is now available for ½-in. flow lines. It will be particularly useful in ratio flow control systems where small flows are ratioed to larger ones.

Flow rates as low as 3 gpm can be measured by this new instrument. *Foxboro Co.*

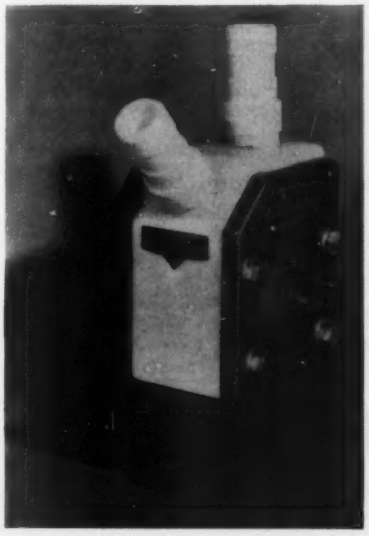
Circle No. 37 on Readers' Service Card

Swivel joints for pipe hook-ups

New swivel joints for higher pressures and temperatures are now being manufactured. Called Series 750 Type S, these joints handle pressures to 750 psi and temperatures to 750°F.

The joints are used to provide pivot points in pipe hook-ups to make the piping movable or flexible. Sizes 1 in. and 1¼ in. are available from stock, and other sizes are available to order. Complete specifications and information on this new series are available from *Barco Mfg. Co.*

Circle No. 38 on Readers' Service Card



Plastic pump

Here is the new Marlex 50 polyethylene-constructed pump designed to handle extremely-corrosive fluids at temperatures up to 260°F. The pump is available in capacities from 1/3 to 40 gpm. *Vanton Pump & Equipment Corp.*

Circle No. 39 on Readers' Service Card

Polyvinyl acetate-stearate in bead form

Flexbond Beads Exp. D-13, a copolymer of vinyl acetate and vinyl stearate in bead form, are now being manufactured.

The unique combination of properties of Flexbond Copolymer beads suggests their use in the formulation of paper coatings, adhesives and other specialty products.

Films of Flexbond Beads are clear, transparent, greaseproof, non-toxic, permanently flexible, heat sealable and have good adhesion to most surfaces. The beads are

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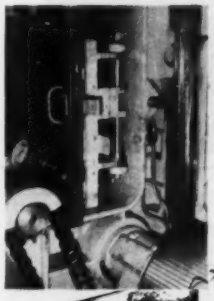
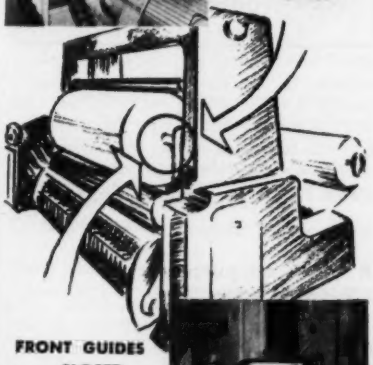
PNEUMATIC REWINDER

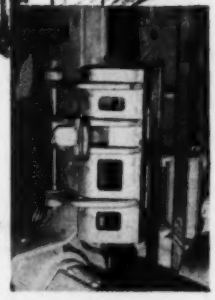


Rewind shaft moves precisely between hardened steel panels without any lateral play.

FRONT GUIDES OPEN



FRONT GUIDES CLOSED



Shaft ends are provided with ball bearings.

Some of the other features:

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- Rapid knife setting system
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- All rollers are driven

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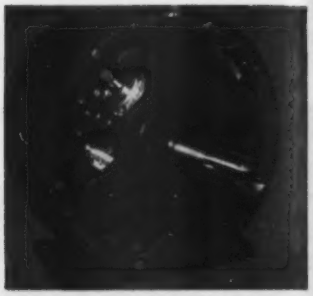


New Products . . .

soluble in benzene, toluene, methanol, methyl acetate, carbon tetrachloride and other solvents in which vinyl acetate homopolymer beads are soluble. *Colton Chemical Co. Div., Air Reduction Co. Inc.*

Circle No. 40 on Readers' Service Card

A white all-purpose lithium grease

A white all-purpose lithium grease called Siloo White Lube is said to replace as many as six or seven specialized greases.

Impervious to water, steam and/or industrial chemicals, Siloo White is reported to afford perfect lubrication under all conditions.

This grease is now available in tubes, 1-lb cans and drums. *Siloo Corp.*

Circle No. 41 on Readers' Service Card

Belt (stream) weigher

A new belt (stream) weigher known as the Pneu-Weigh is now on the market to meet the needs of continuous process industries for measurement of control in the flow of dry materials at rates from 0-3000 lb per min.

The unit is said to hold accuracy within plus or minus ½ per cent of the maximum rate. It is designed to feature a positive chain drive to eliminate slippage and continuous integration which totalizes correctly regardless of belt speed. *Omega Machine Co. Div., B-I-F Industries Inc.*

Circle No. 42 on Readers' Service Card

Weather-protected motors

Announcement has been made of a new line of weather-protected motors designed for outdoor operation under extreme weather conditions.

Ratings from 250 to 1500 hp are manufactured in this new line. *Louis Allis Co.*

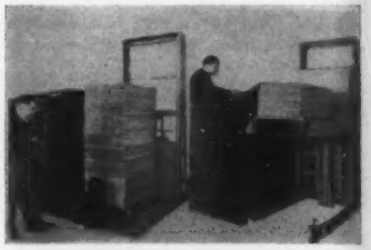
Circle No. 43 on Readers' Service Card

Rotorseals having lifetime lubrication

Fawick Corp. has announced the availability of standard B2 and C2 rotorseals which are said to never require additional lubrication.

These rotorseals are compact devices for transmitting air, liquids or gases from stationary sources into rotating shafts. The B2 model will operate at speeds to 4000 rpm and the C2 up to 3000 rpm. Both models are applicable to all types of single-passage applications at pressures to 150 psi. *Fawick Airflex Div., Fawick Corp.*

Circle No. 44 on Readers' Service Card



Unit for constant-level feeding

Known as Powrlift Model 68, this unit has been designed for constant-level feeding applications.

The Powrlift elevates skid loads, truck loads or pallet loads to machine or press bed feed-in height, with the top of the load kept at the desired level by an operator using a remote foot-operated control switch on the end of a 15-ft. cable.

Height of elevation is 120 in. from the floor, with a down height of ⅛ in. from the floor. Load capacity is up to 4000 lb. *Langley Mfg. Co.*

Circle No. 45 on Readers' Service Card

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NEW LITERATURE

Books

POLYAMIDE RESINS. By Donald E. Floyd. Published by Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y. 230 pages. $450.

This is the third in the series of short books emphasizing the applications of the various types of commercial material of the plastics industry.

Containing the basic chemistry and raw materials of polyamide resins, methods for their manufacture, this book is a definitive discussion of key properties and information on all important applications. These include fibers and filaments, coatings and films, moldings, extrusions, adhesives, inks, castings and sealants.

Throughout the book an effort is made to relate applications to resin structure. It also explains why certain polyamides are used in certain fields and predicts and discusses future trends.

DYNAMICS OF ECONOMIC GROWTH: THE AMERICAN ECONOMY, 1957-1975. By Charles Frederick Roos, Ph.D. Published by Econometric Institute Inc., 230 Park Ave., New York 17, N. Y. 339 pages. $10.00. Educational and public libraries $6.00 per copy.

This new book considers the economic forces which have led to growth in production, income and construction activity in the United States and indicates the probable strength of these forces through 1975. Specific numerical forecasts are given for population, production, construction, hourly earnings of labor, productivity, prices, income and other significant general economic factors.

The author presents data, economic and statistical analysis, reasons and conclusions which every business executive, economist and political analyst will want to study carefully.

Manufacturers' Publications

These items are numbered for your convenience. Copies of the publications may be requested at no obligation through our Readers' Service Dept. Use the handy business reply card which accompanies this issue.

Static speed control for paper machines

General Electric Co. has published a four-page bulletin discussing static speed control for paper machines, stressing the high accuracy, low drift and high speed of response of the company's equipment. A simplified diagram of a static excitation circuit for a paper machine section is provided in the bulletin along with other benefits and features of the equipment.

Circle No. 46 on Readers' Service Card

Slurry pump

Morris Machine Works has released a bulletin describing capacities and applications of its heavy-duty, low-speed RX slurry pump. The bulletin provides operating data and specifications for continuous duty.

Circle No. 47 on Readers' Service Card

Gearmotors

Jordan Co. Inc. A new eight-page bulletin gives information on the Shaftrol and Valvetrol shaft-mounted positioning gearmotors for valves, drives, pumps and other applications. Specifications on a new Digital control system for machine tool positioning and for process control are presented for the first time.

Circle No. 48 on Readers' Service Card

Picco resins

Pennsylvania Industrial Chemical Corp. is offering a 12-page brochure that includes complete property data on its line of resins. The bulletin features charts showing physical and chemical data, melt viscosities, compatibilities and solubilities.

Circle No. 49 on Readers' Service Card

Controlling paper quality

Detectron Inc. has just published a bulletin describing an electronic unit known as the Detectron, which is designed to detect, classify, record and control paper quality. The unit is said to provide electronic inspection 100 per cent of the time over 100 per cent of the web—even at speeds up to 2000 fpm. The bulletin provides clear photos of the unit and gives technical data of its application. The company invites your request for a copy of this bulletin.

Circle No. 50 on Readers' Service Card

Defoamer

Belgian Industrial Information Service is distributing a bulletin published by a Belgian manufacturer describing the advantages, preparation, storage, practical results of use, etc. of the new anti-foam agent, Mostic P.

Circle No. 51 on Readers' Service Card

Acrylic emulsions for paper modification

Rohm & Haas Co. is offering a new technical leaflet on the use of the Rhoplex acrylic emulsions. This bulletin gives information on paper saturation, beater addition methods and the bonding of synthetic fiber papers to produce higher tensile strength and superior edge tear.

Circle No. 52 on Readers' Service Card

Metal stitching

Acme Steel Co. has published a booklet entitled, "Metal Stitching: A New Idea in Fasten-

Now available in book form

Technology of Paper Coating

by H. Witcoff
Director of Chemical Research, General Mills Inc.

and A. W. J. Dyck
Editorial Director, The PAPER INDUSTRY

The latest developments in the technology of paper coating are brought to the reader clearly and concisely in this new book that is based with some revision on a series of articles appearing in The PAPER INDUSTRY from May 1956 through May 1957.

The up-to-the-minute techniques in general use are described in detail. Various specific methods of on-the-machine and off-the-machine coating processes are described and illustrated. Of major importance is the discussion of properties and uses of new as well as established organic and inorganic coatings in wide and specialized usage. A number of typical formulations are shown.

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POSTERS

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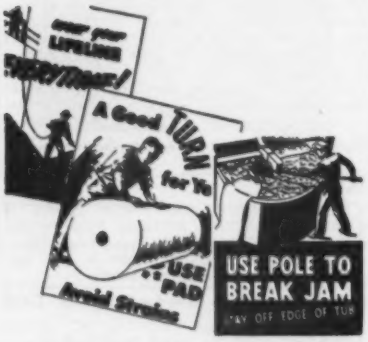

Posters should be one of the top aids in your safety program. No other safety medium can reach your entire audience—not once, but many times each day—with such low-cost safety messages. They are directed at the worker acts and worker attitudes that lead to accidents. Posters lend *timeliness, repetition and continuity* to your safety program . . . the three fundamental principles of direct selling.

The National Safety Council maintains a stock of posters that covers all industries, operations and phases of safety and health. These posters are produced in two sizes: "A" size, 8½"x 11½", and "B" size, 17x23". Their colorful illustrations and eye-catching captions make them ideal for the mass selling of safety.

Write for a free copy of the Directory of Occupational Safety Posters. This 72 page catalog illustrates 744 posters, indexed and classified for specific operations.

NATIONAL SAFETY COUNCIL

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ing." This 16-page booklet gives detailed information on stitching metal to metal or metal to non-metallic materials and illustrates several typical applications. The booklet also contains over 25 pictures and over 30 drawings which show all of the company's metal stitchers.

Circle No. 53 on Readers' Service Card

Shaft-mounted drives

Falk Corp. has prepared an all-new product bulletin pertaining to the complete line of the company's shaft-mounted drives. These drives are designed for applications in the range from ½ — 50 hp and from 420 — 5 rpm output speed. The bulletin includes description of unit design and construction and suggestions on using the drives to solve various application problems.

Circle No. 54 on Readers' Service Card

Single rotating disc pulp refiner

Sprout, Waldron & Co. Inc. has available, a fully illustrated 8-page bulletin on the company's single rotating disc pulp refiner. In addition to detailed design and construction of this 36-2 refiner, the booklet illustrates various plate designs and describes the extensive company laboratory testing facilities.

Circle No. 55 on Readers' Service Card

Health physics

Tracerlab Inc. A new pamphlet offering a comprehensive discussion of all phases of health physics is available from the company. The problems of health physics range from personal protection in the case of an individual engaged in nuclear research work to the protection of entire communities in the case of installation of nuclear power reactors.

Circle No. 56 on Readers' Service Card

Steel tanks and plate work

Chicago Bridge & Iron Co. has published a 4-page illustrated brochure entitled, "Steel Tanks and Plate Work for the Paper Industry." The brochure describes Hortonclad and special alloy structures, flat-bottom storage tanks, elevated tanks and Conkey evaporators.

Circle No. 57 on Readers' Service Card

Pyrex pipe and fittings

Corning Glass Works has published a 44-page manual entitled, "Pyrex brand double-tough glass pipe and fittings". Design, engineering and installation are among the main sections of the manual. Principal topics also include layout, pipe hanging, testing the line and maintenance and cleaning.

Circle No. 58 on Readers' Service Card

Polyethylene glycols

Union Carbide Chemicals Co. Div., Union Carbide Corp. has published a new 54-page booklet on the properties, applications, storage, specifications and testing of Carbowax polyethylene glycols. Carbowax polyethylene glycols are water-soluble, non-volatile, unctuous liquids and solids used for water-soluble lubricants, emulsifying agents, adhesives and paper coatings.

Circle No. 59 on Readers' Service Card

Clutch-brake

Stearns Electric Corp. has announced the design of a new miniature clutch-brake for use in applications requiring minimum torque and size. The company is offering a bulletin giving complete technical data and drawings on this new clutch-brake.

Circle No. 60 on Readers' Service Card

Strapping machine

Acme Steel Co. has prepared an Idea in Action report on the use of the company's F3 strapping machine. The report describes an installation of this machine at National Container Corp. of California. It has been stated that after installation of this machine the company has achieved better product flow and a 50-per cent reduction in packaging and handling time.

Circle No. 61 on Readers' Service Card

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Tubing, pipe and welding fittings

Tubular Products Div., Babcock & Wilcox Co. presents important information on the application of tubing, pipe and welding fittings in a booklet that is now available. The information can assist the buyer or engineer in determining the proper material to specify and also indicate the latest techniques in fabrication.

Circle No. 62 on Readers' Service Card

Protective gloves

Mine Safety Appliances Co. in its new eight-page bulletin describes the company's line of protective gloves. These gloves are made of five types of molded rubber and synthetic materials in various weights, sizes and types. A selection guide showing the relative resistance of the different materials to nearly 200 common chemicals and their comparative physical characteristics is featured.

Circle No. 63 on Readers' Service Card

Industrial waste and water conservation

Link-Belt Co. has filmed practical solutions to the problems of industrial waste and water conservation. The motion picture titled, "Pure and Simple" highlights ways the industry can conserve this natural resource by combatting polution, salvaging valuable by-products, re-circulating water and treating sewage wastes. The film also shows how these water problems are solved by installations at pulp and paper mills, chemical plants, etc.

Circle No. 64 on Readers' Service Card

Centrifugal pumps

Ingersoll-Rand describes the company's centrifugal pumps designed for continuous heavy-duty operation. A complete table of pump dimensions and cross-sectional views is also included in the bulletin. These pumps are horizontally-split, single-suction built with 3, 4, 6 or 8 stages for capacities from 200-2800 gpm.

Circle No. 65 on Readers' Service Card

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Opportunity for Process Engineer in paper coating plant. Engineer required to do production assistance in paper coating operations and to establish and maintain specification work in production. Experience in web handling and chemical background desirable. Location in Great Lakes area. Address replies to Box 663, The Paper Industry.

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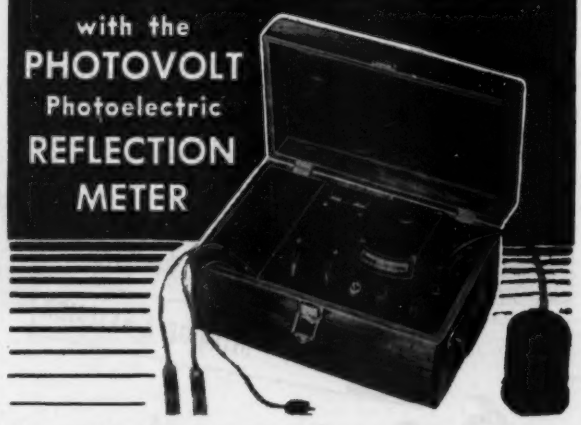

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PHOTOVOLT CORP.
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Necrology . . .
(Continued from page 52)

policy. Prior to becoming associated with the Ohio firm 18 years ago in finance, Wilson had devoted many years to engineering and to investment research. He was at one time an engineer for Westinghouse Electric & Mfg. Co.

George A. Popp

George A. Popp, traffic and service manager for Crystal Tissue Co. of Middletown, Ohio, died February 9 at the age of 65. Well known throughout the paper industry, he had spent his entire business career with Crystal and would have marked his 50th anniversary with the firm October 31.

Born in Millville, Ohio, Popp joined the Middletown company in 1908 in the finishing room. At the age of 21 he was made foreman of that department and in 1925 was given charge of scheduling and pricing orders. In 1945 Popp was named to the post he held at the time of his death.

Harry C. Fisher, 57, consultant to the technical department of the Gardner Div. of Diamond Gardner Corp. in Lockland, Ohio, died recently at his Dayton home. An inventor active in trade associations, he had been associated with Gardner since 1920.

Paul Logan, vice president and general manager of Logan-Long Co., died in March in Chicago at the age of 48. He had recently made his home in Franklin, Ohio.

Ralph R. Cole, 57, since 1953 vice president and treasurer of Consolidated Water Power & Paper Co., died in March while vacationing at Delray Beach, Fla. His home was in Wisconsin Rapids, Wis.

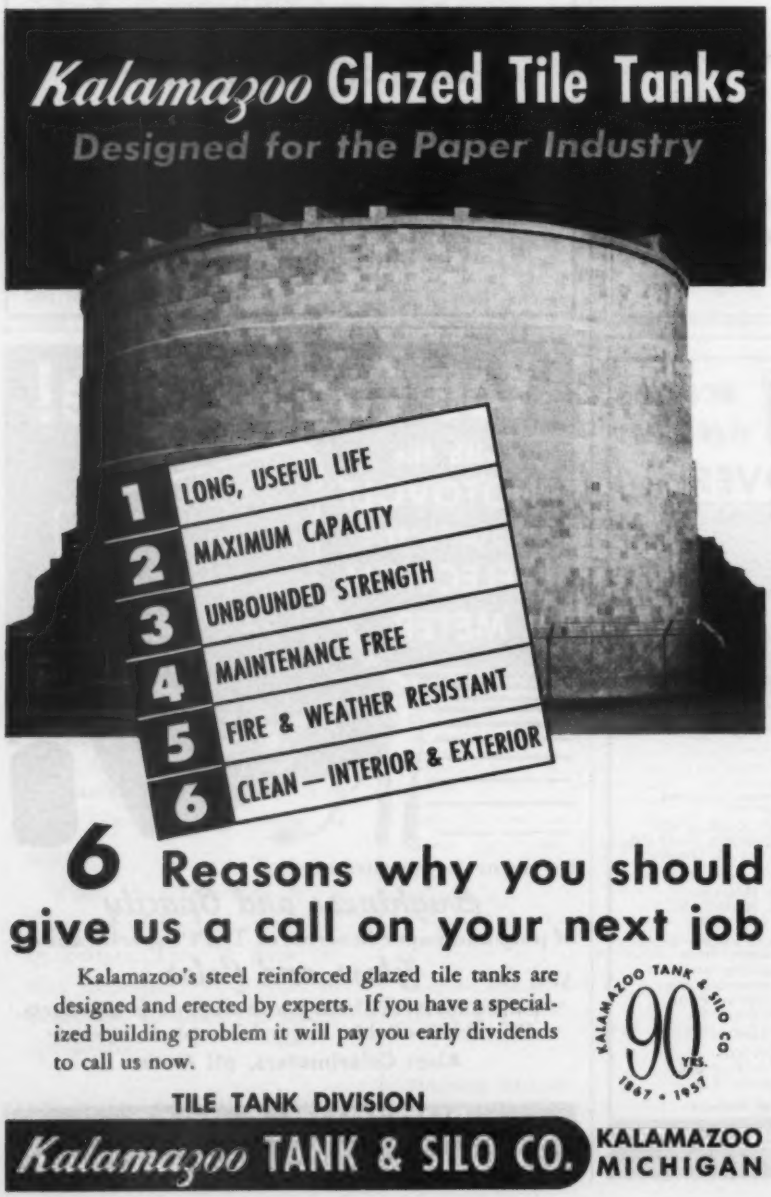
Walter V. Wentworth, vice president and mill manager for Penobscot Chemical Fibre Co. until his retirement several years ago, died at his Old Town, Maine home March 8 at the age of 64. Prior to his association with Penobscot Chemical Fibre he was superintendent for the old Ticonderoga Pulp & Paper Co. in Ticonderoga, N. Y.

J. Gilbert D'Aoust, plant engineer for Powell River Co. Ltd. in Powell River, B. C., died in February following a lengthy illness. He was 52. He was associated with the firm from 1934 to 1940, when he joined the staff of Consolidated Paper Corp. Ltd. in Port Alfred, Que. Following associations with Price Bros. & Co. Ltd. and Sorg Pulp Co. Ltd., he rejoined Powell River in 1945 as development engineer, becoming senior project engineer early in 1955 and plant engineer later that same year.

Raymond A. Richards, 66, a vice president of the International Brotherhood of Pulp, Sulphite & Paper Mill Workers, died recently at his Wisconsin Rapids, Wis. home. At one time a member of the board of regents of the University of Wisconsin, Richards represented the union in Wisconsin, Michigan and Minnesota.

Mrs. Rita Everest, 75, widow of D. C. Everest, long-time head of Marathon Corp., died in January at her Wausau, Wis. home.

Clarence E. Jackson, 67, who had held several executive positions with Consolidated Water Power & Paper Co. prior to his retirement in 1957, died in January at his Wisconsin Rapids, Wis. home. At the time of his retirement he was production manager of the firm's book mills and manager of the Wisconsin Rapids Div.


Kalamazoo Glazed Tile Tanks
Designed for the Paper Industry
1 LONG, USEFUL LIFE
2 MAXIMUM CAPACITY
3 UNBOUNDED STRENGTH
4 MAINTENANCE FREE
5 FIRE & WEATHER RESISTANT
6 CLEAN—INTERIOR & EXTERIOR
6 Reasons why you should give us a call on your next job
Kalamazoo's steel reinforced glazed tile tanks are designed and erected by experts. If you have a specialized building problem it will pay you early dividends to call us now.
KALAMAZOO TANK & SILO CO. 90 YRS. 1867 • 1957
TILE TANK DIVISION
Kalamazoo TANK & SILO CO. KALAMAZOO MICHIGAN

MARKET QUOTATIONS

RAGS (Domestic)

New Cotton Cuttings

The following are brokers' and large dealers' average buying prices for sizeable lots in cents per pound f.o.b. New York:

	per cwt.	
No. 1 white shirt cuttings	13.00—	13.50
Soft unbleached muslins	15.50—	16.00
Fancy shirt cuttings	4.50—	5.00
No. 1 percales	5.50—	6.00
No. 1 washables	2.25—	2.50
No. 1 light silesias	6.50—	7.00
No. 1 light prints	4.75—	5.00
Light flannelettes	6.50—	7.00
Cottonades	2.75—	3.25
Blue overall cuttings	6.75—	7.25
Blue cheviots	6.75—	7.25
Canton flannels, bleached	10.50—	11.00
Canton flannels, unbleached	10.50—	11.00
Osnaburg cuttings	9.50—	10.50
Underwear cuts, bleached	14.50—	15.00
Underwear cuts, unbleached	14.50—	15.00
Sun tan khaki cuttings	5.00—	5.50
American linen cuttings	6.75—	7.25

Cotton Rags

The following are prices, cents per pound, paid by dealers and brokers f.o.b. New York:

	per cwt.	
No. 1 roofing (Chicago)	.70—	.75
No. 2 roofing (Chicago)	.50—	.55
Twos and blues, repacked	1.50—	1.75
Thirds and blues, repacked	1.50—	1.75
No. 1 whites, repacked	—	
No. 1 whites miscellaneous	—	
No. 2 whites, repacked	—	
No. 2 whites, miscellaneous	—	

RAGS (Foreign)

(ex dock New York City)

New Rags

	per cwt.	
New dark cuttings	Nominal	
New mixed cuttings	Nominal	
New light silesias	Nominal	
Light flannelettes	Nominal	
Unbleached cuttings	Nominal	
New white cuttings	Nominal	
New light oxfords	Nominal	
New light prints	Nominal	

Old Rags

	per cwt.	
No. 1 white linens	Nominal	
No. 2 white linens	Nominal	
No. 3 white linens	Nominal	
No. 4 white linens	Nominal	
No. 1 white cottons	Nominal	
No. 2 white cottons	Nominal	
No. 3 white cottons	Nominal	
No. 4 white cottons	Nominal	
Extra light prints	Nominal	
Ordinary light prints	Nominal	
Medium light prints	Nominal	
Dutch blue cottons	Nominal	
French blue cottons	Nominal	
French blue linens	Nominal	
Checks and blues	Nominal	
Linsey garments	Nominal	
Dark cottons	Nominal	
Old shopperies	Nominal	

ROPE and BAGGING

F.o.b. and ex dock New York City

Gunny No. 1, domestic	4.75—	5.00
Gunny No. 1, foreign	4.50—	5.00
No. 1 manila rope, domestic	6.00—	7.00
No. 1 manila rope, foreign	5.00—	6.00
New burlap cuts (soft)	6.00—	6.50
Sisal strings	—	
Mixed strings	—	

WASTE PAPER

The following are prices, dollars per net ton, paid by brokers and large dealers for carload quantities of baled stock, f.o.b. cars New York:

No. 1 hard white envelope cuttings	100.00—	110.00
No. 1 hard white shavings	80.00—	85.00
No. 1 soft white shavings	45.00—	50.00
Soft white shavings, uncoated	55.00—	65.00
Fly leaf shavings No. 1	17.00—	22.00
Fly leaf, woody, No. 1	17.00—	22.00
Mixed colored shavings	18.00—	20.00
No. 1 books and magazines	13.00—	14.00
Ledger stock, white, No. 1	40.00—	42.50
Ledger stock, colored, No. 1 (Midwest ship)	25.00—	
New manila envelope cuttings (free of groundwood)	60.00—	65.00
New manila envelope cuttings (containing groundwood)	50.00—	55.00
Manilla tab cards	55.00—	60.00
Colored tab cards	40.00—	50.00
New northern kraft envelope cuttings	60.00—	65.00
Triple sorted kraft, 100%	25.00—	30.00
No. 1 old kraft	25.00—	
White news cuts, No. 1	45.00—	50.00
No. 1 overissue news	14.00—	16.00
Folded news, special	14.00—	15.00
Folded news, ordinary	12.00—	13.00
Old corrugated boxes	19.00—	20.00
New jute corrugated cuts	19.00—	20.00
Mill wrappers	9.00—	11.00
Boxboard cuttings	6.00—	7.00
No. 1 mixed paper	3.00—	4.00

CHEMICALS

F.o.b. New York City

Alum, ammonium		
Granular, bags, works, cwt.	4.30—	
Lump, drums, works, cwt.	5.05—	
Powdered, drums, works, cwt.	5.20—	
1-Arginine, drums, kilo	74.80—	
Blanc Fixe		
Direct process, bags, c.l., works, ton	115.00—	
L. c. l., ton	125.00—	
Bleaching Powder, drums, cwt	—	
Casein, domestic acid precipitated		
30-mesh bags, 10,000-lb. lots or more, shipping point, lb	.56—	
80-mesh bags, 10,000-lb. lots or more, shipping point, lb	.64—	
China Clay, domestic dry-ground, airfloat, 99%		
325-mesh bags, c.l., Georgia works, ton	10.00—	12.00
300-mesh bags, c.l., Georgia works, ton	13.50—	14.50
Imported, white, lump, bulk, c. l., ex dock Phila, Portland, Me., gross ton	20.00—	35.00
Chlorine, liquid		
Tanks, single units, works, freight equaled, cwt.	3.15—	
Glycerine, refined (CP, USP) 99%, drums, c. l., delivered lb.	.29⅜—	
Litharge, commercial powdered		
Barrels, c. l., works, freight equalled lb.	.14¾—	
Rosin, gum, c. l., f.o.b. New York, cwt.		
K, M	9.05—	
N	9.20—	
WG	9.70—	
WW	9.80—	
Rosin, wood, c. l., f.o.b., shipping point, cwt.		
K, M	7.80—	
N	7.90—	
WG	8.25—	
WW	8.50—	
Saltcake, domestic, bulk works, 100% Na_2SO_4 basis ton	28.00—	
Soda Ash		
Dense, 58%, paper bags, c.l. works, cwt	1.90—	
Light, 58%, paper bags, c.l. works, cwt	1.85—	
Soda, caustic		
Flake, 76%, drums, c. l. works, freight equalled, cwt.	4.70—	
Solid, 76%, drums, c. l. works, cwt.	4.30—	
Sodium Silicate		
40°Be, 1:3, 2, turbid, drums, c. l., works, cwt.	1.55—	
52°Be, turbid, 1:2, 4, drums, c. l., works, cwt.	2.65—	
Starch		
Pearl, 140-lb. bags, cwt.	7.53—	
Pearl, 100-lb. bags, cwt.	7.38—	
Powdered, 100-lb. paper bags, cwt.	7.50—	
Sulfur, crude		
Bulk, c. l. mine, contract, long ton	23.50—	
Talc		
Domestic, fibrous, N. Y., grd., bags, c. l. works, ton	28.00—	
Canadian, ground, bags, c. l. works, ton	20.00—	35.00
Titanium Pigment		
Calcium-rutile base, regular, bags, c. l., lb.	.09⅜—	
High-tinting, drums, c. l., lb.	.14⅜—	
Zinc Oxide Pigment, American process		
Lead-free, bags, c. l., freight allowed, lb.	.14½—	
Leaded, 35%, bags, c. l., freight allowed, lb.	.15½—	

WOOD PULP

Quotations on domestic and Canadian pulp, dollars per short air-dry ton delivered consuming mills including basic allowances, follow:

Bleached sulfite, No. 1	155.00—	
Bleached sulfite, Canadian	155.00—	
Unbleached sulfite	135.00—	
Unbleached sulfite, Canadian	135.00—	
Bleached soda	150.00—	
Bleached soda, Canadian	150.00—	
Kraft, bleached hardwood	152.00—	
Kraft, bleached	157.00—	
Kraft, bleached southern	160.00—	
Kraft, bleached Canadian	160.00—	162.50
Kraft, unbleached southern	120.00—	
Kraft, unbleached, Far West	125.00—	
Kraft, unbleached Canadian eastern	135.00—	
Kraft, unbleached Canadian western	120.00—	125.00
Kraft, semi-bleached southern	140.00—	
Sulfite screenings	—	
Sulfate screenings	—	
Groundwood, dom.	82.50—	90.00

Quotations on imported wood pulp, dollars per short air-dry ton on dock American Atlantic ports, follow:

Bleached sulfite, Swedish, freight allowed	155.00—	
Bleached sulfite, Norwegian, del'd with limited freight allowance	155.00—	
Bleached sulfite, Finnish, freight allowed	155.00—	
Unbleached sulfite, Swedish, freight allowed	135.00—	
Unbleached sulfite, Finnish, freight allowed	135.00—	
Kraft, unbleached, Swedish, freight allowed	125.00—	
Kraft, unbleached, Finnish, freight allowed	125.00—	
Kraft, bleached, Swedish, on dock	157.50—	162.50
Kraft, bleached, Norwegian	155.00—	

PAPER

Quotations are mill quotations Chicago

Boards (prices per ton, delivered in Chicago, 10 tons or more):	
Plain chip	107.50
News vat lined chip	110.00
.009 chip, rolls	100.00
Filled news	111.50
Solid news	114.50
White vat lined chip	144.50
Chip tube and can stock	112.50
Single manila lined chip	162.50
Single jute lined chip	147.50
Container, 42-lb.	
Kraft liner (per 1000 sq. ft.)	2.68
White patent coated	
.020	175.00
.018	177.50
.016	182.50
Book Paper (f.o.b. Chicago, c.l. cases per cwt):	
No. 1 enamels	20.05
No. 2 enamels	19.05
Machine-coated, 45- to 100-lb.	15.05— 18.50
60-lb. + uncoated offset, 25 × 38 (2000 lb.)	17.05
"A" grade English finish untrimmed, 25 × 38 (2000 lb.)	16.15
Rag Content Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons):	per cwt
100% rag	64.70
75% "	49.65
50% "	37.80
25% "	31.90
Rag Content Ledger (white, 5000 to 10,000 lb., ream sealed cartons):	
100% rag	65.85
75% "	50.80
50% "	39.00
25% "	33.10
Sulfite Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons):	
No. 1	22.50
No. 2	21.75
No. 4	20.35
Sulfite Ledger (white, 5000 to 10,000-lb., ream sealed cartons):	
No. 1	23.70
No. 2	22.95
No. 4	21.55
Newsprint (contract base price)	per ton
Rolls, standard	135.00
Sheets	Standard differentials
Tissues (carlots)	per ream
White No. 1	
White No. 2	
Bleached anti-tarnish	
Colored	
Anti-tarnish kraft	
Manila	
Napkins, semi-crepe (12½ lb. to M shts) per case	
Napkins, full crepe and embossed (12½ lb. to M shts) per case	
Toilet, bleached (M shts) per case	
Toilet, unbleached (M shts) per case	
Wrappings (kraft, basis 50 lb. and heavier)	per cwt
Standard wrapping	9.50
Butchers, counter rolls	10.50
Standard bagging, mill rolls	
Shipping sack, mill rolls	
Gumming, mill rolls	
Asphalting, mill rolls	
Envelope, mill rolls	

SAFETY NEWS

1957 NSC Pulp and Paper Contest Shows 1-Per Cent Rate Decrease

COMPETING MILLS in the 1957 National Safety Council contest for pulp and paper firms have reported an accident frequency rate 1 per cent below that of 1956. (Not included in this figure is the Pulpwood Logging Div., which showed an increase of 48 per cent.)

Sixty contestants maintained perfect scores, as compared to 48 in 1956.

The year's frequency rate for all divisions (except pulpwood logging) was 7.08; for the pulp and paper division, 6.82 (down 1 per cent); for the paper converting division, 7.75 (down 3 per cent), and for the pulpwood logging division, 78.75 (up 48 per cent).

Contestants numbered 578, up from the 531 of 1956.

The total exposure reported was 579,417,000 man-hours, up 2 per cent from the previous year. A total of 5441 injuries was reported, up 16 per cent from 1956.

Mills in Group A of Division I (units averaging more than 170,001 man-hours monthly) recorded a 6-per cent decrease; those in Group B (85,001 to 170,000 man-hours), a 4-per cent increase; those in Group C (42,501 to 85,000 man-hours), an 11-per cent increase; those in Group D (21,226 to 42,500 man-hours), a 9-per cent decrease, and those in Group E (6000 to 21,225 man-hours), a 30-per cent decrease.

In paper converting the paper bag group showed an increase of 8 per cent; boxes and cartons, a decrease of 8 per cent; roofing paper, an increase of 1 per cent; insulation and building board, an increase of 4 per cent, and pulp and paper specialties, a decrease of 3 per cent.

From the eligible mills in Division I the board of judges will choose the mill with the most outstanding record. This plant will be awarded the grand prize, the Edward Benton Fritz Memorial Trophy, presented each year by THE PAPER INDUSTRY.

The National Safety Council has listed as follows the mills with the best records in each division — frequency rates in parentheses:

Division I—Pulp and Paper Mills

Group A

Kimberly-Clark Corp., Kimberly, Wis. (1.30); P. H. Glatfelter Co., Spring Grove, Pa. (1.34); Sonoco Products Co., Hartsville, S. C. (1.56).

Group B

Brunswick Pulp & Paper Co., Brunswick, Ga. (0.00); Marinette Paper Co., Marinette, Wis. (0.00); Chesapeake Corp. of Virginia, West Point, Va. (0.00).

Group C

Falls Paper & Power Co., Oconto Falls, Wis. (0.00); Cornell Paperboard Products Co., boxboard mill, Milwaukee (0.00); National Vulcanized Fibre Co., Yorklyn, Del. (0.00).

Group D

Strathmore Paper Co., Turners Falls, Mass. (0.00); Congoleum-Nairn Inc., Cedarhurst, Md. (0.00); Certain-Teed Products Corp., York, Pa. (0.00); United States Gypsum Co., Oakmont, Pa. (0.00); American Can Co., Marathon Div., Ashland, Wis. (0.00); Fort Orange Paper Co., paper mill, Castleton-on-Hudson, N. Y. (0.00); Certain-Teed Products Corp., Richmond, Cal. (0.00); Container Corp. of America, Chattanooga, Tenn. (0.00); Flintkote Co., Lockport, N. Y. (0.00); Coos Bay Pulp Corp., Empire, Ore. (0.00); Certain-Teed Products Corp., Niagara Falls, N. Y. (0.00).

Group E

Mead Corp., Nashville, Tenn. (0.00); United States Gypsum Co., Galena Park, Texas (0.00); National Gypsum Co., Kalamazoo, Mich. (0.00); St. Regis Container Corp., Muskingum Mill Div., Coshocton, Ohio (0.00); American Writing Paper Corp., Albion Div., Holyoke, Mass. (0.00); Flintkote Co., Little Ferry, N. J. (0.00); Celotex Corp., Madison, Ill. (0.00); United States Gypsum Co., Oakfield, N. Y. (0.00); Robertson Paper Box Co. Inc., Montville, Conn. (0.00).

United States Gypsum Co., Gypsum, Ohio (0.00); International Paper Co., Livermore Falls, Maine (0.00); National Gypsum Co., Newburgh, N. Y. (0.00); Johns-Manville Corp., Tilton, N. H. (0.00); National Vulcanized Fibre Co., Marshall Bros. mill, Yorklyn, Del. (0.00); Charmin Paper Products Co., Little Rapids, Wis. (0.00); Spaulding Fibre Co. Inc., Hayes plant, North Rochester, N. H. (0.00).

Division II—Paper Converting

Paper Bags

Thilmany Pulp & Paper Co., bag mill, Kaukauna, Wis. (0.00); St. Regis Paper Co., Kansas City, Mo. (0.00); Pillsbury Mills Inc., Wellsburg, W. Va. (0.00); St. Regis Paper Co., Playa Ponce, Puerto Rico (0.00).

Boxes and Cartons

Group A

Sealright Co. Inc., Kansas City, Kans. (0.00); Container Corp. of America, Carton Div., Fort Worth, Texas (0.00); General Foods Corp., Carton & Container Div., Battle Creek, Mich. (1.03).

Group B

Fibreboard Paper Products Corp., carton plant, Portland, Ore. (0.00); Container Corp. of America, Santa Clara, Cal. (0.00); Standard Packaging Corp., Bradley & Gilbert Co. Div., Louisville, Ky. (0.00) Container Corp. of America, Traver Div., Chicago (0.00); Container Corp. of America, Muskogee, Okla. (0.00); Fibreboard Paper Products Corp., San Joaquin Div., Antioch, Cal. (0.00).

Roofing Paper

Ruberoid Co., Joliet, Ill. (0.00); Ruberoid Co., Erie, Pa. (0.00); Certain-Teed Products Corp., Dallas, Texas (0.00); Ruberoid Co., Minneapolis (0.00); Johns-Manville Corp., Marrero, La. (0.00); Ruberoid Co., Baltimore (0.00); Flintkote Co., Pioneer Div., Portland, Ore. (0.00); Brantford Roofing Co. Ltd., St. John, N. B. (0.00); Certain-Teed Products Corp., Tacoma, Wash. (0.00).

Insulation and Building Board

Flintkote Co., Meridian, Miss. (0.00); Johns-Manville Corp., Jarratt, Va. (0.00); Simpson Logging Co., Shelton, Wash. (0.00).

Specialties

Crown Zellerbach Corp., San Leandro, Cal. (0.00); Container Corp. of America, Piqua, Ohio (0.00); Lily-Tulip Cup Corp., Galva, Ill. (0.00).

Division III—Pulpwood Logging

Chesapeake Corp. of Virginia, West Point, Va. (6.47); Crown Zellerbach Canada Ltd., Beaver Cove, B. C. (12.98); St. Anne Power Co., Beaupre, Que. (20.79).

St. Regis Paper Co.

has announced that its company-wide award for the most outstanding safety achievement of the year has been won by its Kansas City, Mo. bag plant. The plant completed 1957 without a lost-time injury.

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HANCHETT CIRCULAR KNIFE GRINDER

For TOP and BOTTOM SLITTER KNIVES
SCORING KNIVES and SEGMENTS
SEMI and FULL Automatic

GUARANTEE:
1. Concentric with Bore and Running Truth .0005
2. Micro Inch Finishes
3. Grinds Single, Double and Compound Bevels
4. Positive — Accurate Fixturing
5. Longer Mill Life (Less Changes)

MODEL SK-24 WET GRIND

TEST GRIND
We are prepared to grind knives for your inspection and Mill Test.

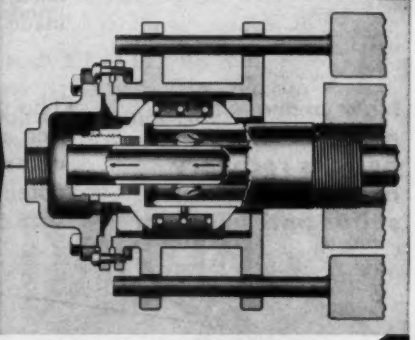
HANCHETT MANUFACTURING CO.
Main Office BIG RAPIDS, MICHIGAN
West Coast PORTLAND 1, OREGON

For High Speed Paper Machines with Revolving Syphon Pipes

In the Type LN Johnson Joints the revolving syphon pipe is made a part of the rotating assembly, yet is permitted longitudinal movement. Sealing is still accomplished without packing. Simple support rods carry all the weight of joint and connections, permit the rotating assembly to "float" freely inside. Special hangers and brackets adapt the mounting for machines with either open or enclosed gearing.

Johnson Joints fit all needs on paper machines, calenders, corrugators, waxers, embossers, roofing machines, printing presses. For full data on Type LN write for Bulletin N-2002.

Type LN Johnson ROTARY PRESSURE Joints
"First in the paper industry"



THE JOHNSON CORPORATION
845 Wood St., Three Rivers, Michigan

Turn the slow-down to your advantage

A metals manufacturer who refused to curtail his expenditure on sales during the current "hard sell" period, and who actually is operating on an increased advertising budget, has reported higher net profits for 1957 compared to 1956 and is sure that 1958 sales will top those of 1957.

The theme of his company's program is "no cost reduction in the selling effort", and the successful implementation of this program shows that a slow-down in business activity can be turned to the advantages of the manufacturer who practices good marketing techniques.

Is the pulpwood industry going to chips?

It is reported that there are certain limitations that will bring a saturation point in the procurement of chips from sawmill and logging waste for the pulping industry, and that such a saturation point will be reached in each region during the next ten years.

On a national scale it is estimated that 80 per cent of the pulpwood will continue to reach the pulp mill in the form of logs or bolts.

Pine gum derivatives used as catalysts

Certain pine gum derivatives known as saturated cyclic terpene hydroperoxides are used as polymerization catalysts in the manufacture of synthetic rubbers, polyester resins, etc.

A USDA-patented process for making and using these pine gum derivatives is available free to industrial users who obtain a license from the USDA.

Effective soil compaction on sandy industrial sites

Soil compaction by Vibroflotation was used in 1952 and in 1956 at Jesup, Ga., for Rayonier Inc. This method will also be used for compacting the industrial site of the Boise Cascade Corp. paper mill at Wallula, Wash.

Compaction, resulting from a simultaneous vibration and saturation of a granular soil by a Vibroflote machine, is achieved by removing the voids between particles through rearrangement of the grains of sand into a tight mass resulting in a firm foundation. There are about 900 compactions being made at Wallula, each consuming 3-4 tons of additional sand.

New process in nickel refining permits recovery of elemental sulfur and selenium

The process based on a direct electrolysis of nickel sulfide, now in operation at International Nickel's refinery at Port Colborne, Ont., permits the recovery of elemental sulfur and selenium as valuable by-products. The sulfur, obtained from a novel 100-ton/day fractional distillation unit, contains less than 5 ppm of selenium and has an unusually low ash and bitumens content.

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*(U.S. Patent Nos. 2,516,632; 2,516,633; 2,516,634)

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